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PREVALENCE OF POLIOMYELITIS

During the week ended October 14, 1939, 375 cases of poliomyelitis were reported as compared with 391 for the preceding week and with 263 for the corresponding median week of the 1934–38 period.

This is the fourth consecutive week which has shown a decrease in cases since the peak week of 501 cases for the week ended September 16.

There is no indication of the appearance of an epidemic in any one State, but rather a decrease is noted in most of the States which have been reporting the highest number of cases. The present trend is in accordance with the usual expectancy for this season of the year; consequently this series of notes on "Prevalence of Poliomyelitis" will be discontinued with this issue.

NATIONAL CANCER INSTITUTE BUILDING COMPLETED

The new National Cancer Institute Building at Bethesda, Md., near Washington, D. C., was turned over to the Surgeon General of the United States Public Health Service by the Procurement Division of the Treasury Department on September 26, 1939. The building is located on a 15-acre tract of land donated for this purpose, and it adjoins the officers' living quarters and other buildings of the National Institute of Health. The building, consisting of three floors and two basements, will house both the scientific laboratories and the administrative offices of the National Cancer Institute.

The Cancer Investigations Station of the Institute at Gibbs Memorial Laboratory, Cambridge, Mass., has been closed, and the 25 members of the staff are being transferred to Bethesda. One cancer research fellow stationed in Rochester, N. Y., is also being transferred.

Under the direction of the Surgeon General of the Public Health Service, the work of the enlarged Cancer Institute will be administered by Dr. L. R. Thompson, Director of the National Institute of Health, Dr. Carl Voegtlin, Chief of the Cancer Institute, Dr. R. R. Spencer, Executive Assistant, and Dr. Ludvig Hektoen, Executive Director of the National Advisory Cancer Council.

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DISABLING MORBIDITY AMONG INDUSTRIAL WORKERS, SECOND QUARTER AND FIRST HALF OF 1939[1]

By WILLIAM M. GAFAFER, *Senior Statistician, United States Public Health Service*

The material presented in this paper is based on periodic reports on disabling sickness and nonindustrial injuries from industrial plants located in Pennsylvania, Illinois, Massachusetts, Connecticut, New York, Ohio, Maine, South Dakota, New Jersey, and Canada. About 170,000 workers are covered, representing the male memberships of mutual sick benefit associations, group insurance plans, and company relief departments. The data presented deal with the frequency of sickness and nonindustrial injuries causing disability lasting more than one week.

SECOND QUARTER AND FIRST HALF OF 1939

A comparison of the frequency rates for the second quarters of 1939 and 1938, as presented in table 1, shows the principal difference to be associated with influenza and grippe, the frequency for 1939 being almost twice that for 1938. While the excess is not so great as that presented by the first quarters of the same years, it is sufficiently large to be reflected in the excess for all respiratory diseases and for all sickness.

The results of combining the experience of the first and second quarters are also shown in table 1. It will be observed that in a comparison of the rates for the first halves of 1939 and 1938 influenza and grippe plays an important part in the increase in the rate for the respiratory diseases as a group, and in the rate for all sickness.

FIRST HALVES OF THE YEARS 1930–39

An examination of the frequency rates for the different causes and cause groups for the first halves of the years 1930–39 revealed the behavior of the nonrespiratory diseases as a group and diseases of the nervous system (neuralgia, neuritis, and sciatica excepted) to be of particular interest. Table 2 and figure 1 show the rates for these two groups of diseases during this period.

Nonrespiratory diseases.—The frequency rates for this group of diseases for the first halves of the 10 years 1930–39 fluctuate about a mean annual rate of 46.0 cases per 1,000 males, with a lower limit of 41.8 in 1934 and an upper limit of 51.5 in 1930, the rate for 1939 (43.7) exceeding only the minimum rate given by 1934. The upper half of figure 1 shows graphically the rates for the 10-year period. It will be observed that a downward trend is in evidence which, while not spectacular, is of sufficient magnitude to arrest attention.

[1] From the Division of Industrial Hygiene, National Institute of Health, Washington, D. C. For the first quarter of 1939, see PUBLIC HEALTH REPORTS for Aug. 25, 1939 (54:1554–1556).

TABLE 1.—*Frequency of disabling cases of sickness and nonindustrial injuries lasting 8 consecutive calendar days or longer among* MALE *employees in various industries, by cause, the second quarter of 1939 compared with the second quarter of 1938, and the first half of 1939 compared with the first halves of the years 1934–38, inclusive* [1]

Cause (Numbers in parentheses are disease title numbers from the International List of the Causes of Death, 1929)	Annual number of cases per 1,000 males				
	Second quarter		First half		
	1939	1938	1939	1938	1934–38
Sickness and nonindustrial injuries [2]	81.5	76.9	103.2	88.2	99.6
Nonindustrial injuries (163–198)	9.5	10.4	9.5	10.6	10.9
Sickness [3]	72.0	66.5	93.7	77.6	88.7
Respiratory diseases	29.6	22.2	47.7	30.8	40.4
Influenza and grippe (11)	13.0	7.4	26.5	12.1	20.5
Bronchitis, acute and chronic (106)	3.3	3.1	4.9	4.7	5.0
Diseases of the pharynx and tonsils (115a)	5.2	4.9	5.4	5.2	5.6
Pneumonia, all forms (107–109)	3.3	1.8	4.0	2.5	3.1
Tuberculosis of the respiratory system (23)	.7	1.1	.7	1.0	.9
Other respiratory diseases (104, 105, 110–114)	4.1	3.9	6.2	5.3	5.3
Nonrespiratory diseases	40.3	42.8	43.7	44.9	45.8
Diseases of the digestive system	12.7	13.8	13.4	13.6	13.8
Diseases of the stomach, except cancer (117, 118)	3.6	4.3	3.6	4.1	3.9
Diarrhea and enteritis (120)	1.1	.9	1.1	.8	1.0
Appendicitis (121)	3.8	4.2	4.2	4.3	4.4
Hernia (122a)	1.7	1.9	1.5	1.8	1.7
Other digestive diseases (115b, 116, 122b–129)	2.5	2.5	3.0	2.6	2.8
Nondigestive diseases	27.6	29.0	30.3	31.3	32.0
Diseases of the heart and arteries, and nephritis (90–99, 102, 130–132)	4.1	3.8	4.6	4.3	4.2
Other genitourinary diseases (133–138)	2.0	2.2	2.2	2.4	2.5
Neuralgia, neuritis, sciatica (87a)	2.0	1.8	2.2	2.3	2.4
Neurasthenia and the like (part of 87b)	.9	.9	1.0	1.3	1.3
Other diseases of the nervous system (78–85, part of 87b)	1.1	1.0	1.0	1.0	1.0
Rheumatism, acute and chronic (56, 57)	3.7	4.0	4.1	4.2	4.6
Diseases of the organs of locomotion, except diseases of the joints (156b)	2.3	2.8	2.7	2.8	3.0
Diseases of the skin (151–153)	2.2	2.7	2.5	2.9	2.7
Infectious and parasitic diseases (1–10, 12–22, 24–33, 36–44)	2.3	2.5	2.6	2.6	3.3
All other diseases (45–55, 58–77, 88, 89, 100, 101, 103, 154–156a, 157, 162)	7.0	7.3	7.4	7.5	7.0
Ill-defined and unknown causes (200)	2.1	1.5	2.3	1.9	2.5
Average number of males covered in the record	170,689	166,435	170,609	169,346	154,445
Number of organizations	26	26	26	26	

[1] In 1939 and 1938 the same organizations are included; the rates for the first halves of the years 1934–38, however, are based on records from the same 26 organizations and some additional reporting organizations.
[2] Exclusive of disability from the venereal diseases and a few numerically unimportant causes of disability.

TABLE 2.—*Frequency of disabling cases of nonrespiratory diseases, and diseases of the nervous system (except neuralgia, neuritis, and sciatica), lasting 8 consecutive calendar days or longer among* MALE *employees in various industries, the first halves of 1930 to 1939, inclusive* [1]

Cause	Annual number of cases per 1,000 men for the first half of the year									
	1930	1931	1932	1933	1934	1935	1936	1937	1938	1939
Nonrespiratory diseases	51.5	48.4	49.3	44.4	41.8	44.0	46.1	46.2	44.9	43.7
Diseases of the nervous system except neuralgia, neuritis, and sciatica	2.5	3.0	2.5	2.3	2.3	2.5	2.3	2.1	2.3	2.0

[1] The data are from table 1 and from the earlier papers of the present series. See PUBLIC HEALTH REPORTS for July 7, 1933; Sept. 29, 1933; Oct. 19, 1934; Nov. 15, 1935; Dec. 4, 1936; Oct. 29, 1937; and Oct. 28, 1938.

Diseases of the nervous system.—The rates for "neurasthenia and the like" and "other diseases of the nervous system" have been combined for the first halves of the years 1930–39 and are given in table 2. The lower half of figure 1 shows the frequencies graphically. It will be seen that the mean annual rate is 2.4 cases per 1,000 males. The maximum (3.0) occurred in 1931 and the minimum (2.0) during the first half of 1939. The downward trend of the rates over the 10-year period is of more than ordinary interest.

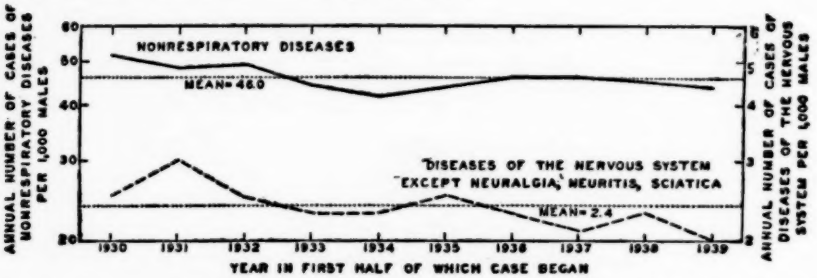
ANNUAL NUMBER OF CASES OF NONRESPIRATORY DISEASES PER 1,000 MALES
NONRESPIRATORY DISEASES
MEAN=46.0
DISEASES OF THE NERVOUS SYSTEM EXCEPT NEURALGIA, NEURITIS, SCIATICA
MEAN=2.4
ANNUAL NUMBER OF CASES OF DISEASES OF THE NERVOUS SYSTEM PER 1,000 MALES
1930 1931 1932 1933 1934 1935 1936 1937 1938 1939
YEAR IN FIRST HALF OF WHICH CASE BEGAN

FIGURE 1.—Frequency (logarithmic) of disability lasting 8 consecutive calendar days or longer caused by nonrespiratory diseases, and diseases of the nervous system (except neuralgia, neuritis, and sciatica) for the first halves of 1930-39, inclusive. (Male morbidity experience of industrial companies which reported their cases to the United States Public Health Service.)

STUDIES IN CHEMOTHERAPY [1]

X. Colorimetric Tests for Aromatic Hydroxylamines and for Further Oxidation Products of Aromatic Amines. Their Demonstration in the Urine Following Sulfanilamide Administration

By SANFORD M. ROSENTHAL, *Senior Pharmacologist*, and HUGO BAUER, *Research Associate, Division of Pharmacology, National Institute of Health, United States Public Health Service*

While the major part of the sulfanilamide administered to animals or man can be recovered in the urine in its free or acetylated form, the

[1] The preceding papers of the series are as follows:

I. The action of sodium formaldehyde sulphoxylate in bacterial infections. By Sanford M. Rosenthal, Pub. Health Rep., 49: 908 (1934). (Reprint No. 1638).

II. Chemotherapy of experimental pneumococcus infections. By Sanford M. Rosenthal. Pub. Health Rep., 52: 48 (1937). (Reprint No. 1796).

III. The effect of p-aminobenzene sulphonamide on pneumococci *in vitro*. By Sanford M. Rosenthal. Pub. Health Rep., 52: 192 (1937). (Reprint No. 1802.)

IV. Comparative studies of sulphonamide compounds in experimental pneumococcus, streptococcus, and meningococcus infections. By Sanford M. Rosenthal, Hugo Bauer, and Sara E. Branham. Pub. Health Rep. 52: 662 (1937). (Reprint No. 1825.)

V. Sulphanilamide, serum, and combined drug and serum therapy in experimental meningococcus and pneumococcus infections in mice. By Sara E. Branham and Sanford M. Rosenthal. Pub. Health Rep., 52: 685 (1937). (Reprint No. 1826.)

VI. The chemotherapy of choriomeningitis virus infection in mice with sulphonamide compounds. By Sanford M. Rosenthal, Jerald G. Wooley, and Hugo Bauer. Pub. Health Rep., 52: 1211 (1937). (Reprint No. 1854.)

VII. Some new sulfur compounds active against bacterial infections. By Hugo Bauer and Sanford M. Rosenthal. Pub. Health Rep., 53: 40 (1938). (Reprint No. 1898.)

VIII. Some toxic effects of repeated administration of sulfanilamide and sulfanilyl sulfanilamide ("disulfanilamide") to rabbits and chickens. By Sanford M. Rosenthal. Pub. Health Rep., 54: 95 (1939). (Reprint No. 2026.)

IX. Antibacterial action of some aromatic arsenic, sulfur, and nitro compounds. By Sanford M. Rosenthal, Hugo Bauer, and Elias Elvove. Pub. Health Rep., 54: 1317 (1939).

possibility still exists that a small part of the drug is further changed in the body. The relatively weak action of sulfanilamide on organisms *in vitro* has led Levaditi (*1*) and Mayer (*2*, *3*) to postulate such a change as involved in the mechanism of therapeutic action.

Mayer has studied the various oxidation products of the amino group, including the 4-hydroxylamino, azo, azoxy, 4-nitroso, and 4-nitrobenzene sulfonamide. In his experiments the hydroxylamino derivative was 100 times as active as sulfanilamide in the test tube but less active therapeutically. The nitro derivative was more active but also more toxic than sulfanilamide in therapeutic tests. Upon the basis of these results Mayer advanced the hypothesis that the slow liberation of the hydroxylamine derivative was involved in the therapeutic action of sulfanilamide. It would be formed in the body more readily from the nitro than from the aminobenzene sulfonamide. More recent work has also suggested the importance of nitro groups (*4*, *5*). The feeble therapeutic action of the hydroxylamine derivative is explained by Mayer as due to its instability, and rapid breakdown following its injection. Marshall (*6*) has confirmed the increased activity of p-hydroxylaminobenzene sulfonamide *in vitro*.

The problem was approached in another way by Locke, Main, Shinn, and Mellon (*7*, *8*) who demonstrated that the anticatalase activity of sulfanilamide was greatly increased by oxidation of the amino group. They demonstrated *in vitro* that inhibition of catalase brought about the accumulation of peroxides in the bacterial cultures and they explain the bacteriostatic action of the drug on this basis. The hydroxylamines have been shown to be highly active as inhibitors of catalase.

It thus becomes of importance to determine whether any of the sulfanilamide is oxidized in its passage through the body. The detection of oxidation products of the amino group of sulfanilamide by reduction methods was unsatisfactory because the small percentages which might be present were obscured by the large amounts of sulfanilamide, and also because the hydroxylamine derivative reacts somewhat to diazotization and cannot be readily differentiated from free sulfanilamide on the basis of the diazo reaction.

In order to detect oxidation products it was necessary to find a method which would eliminate from the reaction the large amount of free sulfanilamide present in the body fluids. Because of its possible physiological significance we were particularly interested in the hydroxylamine derivative.

Bamberger (*15*) has shown that nitrous acid acts upon phenyl hydroxylamine in the following manner:

(1) $R.NHOH + HNO_2 = R.N(NO).OH + H_2O$

(2) $R.N(NO).OH + HNO_2 = R.N=N.NO_3 + H_2O$

In the first stage of this reaction phenyl nitrosohydroxylamine is formed. A second molecule of nitrous acid gives rise to benzene diazonium nitrate. We have found that this same reaction occurs when the 4-hydroxylaminobenzoic acid, $HOHN.C_6H_4.COOH$, or 4-hydroxylaminobenzene sulfonamide, $HOHN.C_6H_4.SO_2NH_2$, is used. In both cases a diazo compound is formed which yields an intense color with the usual coupling reagents.

An attempt was made to keep any free sulfanilamide or other aromatic amine present from taking part in the diazo reaction. This was readily accomplished by preliminary acetylation carried out by shaking the solution with acetic anhydride. The amino groups acetylated in this manner will not be susceptible to diazotization.

Oxidation products which are not acetylated can be reduced to amino groups and estimated colorimetrically by the usual diazotization methods. The problem was further simplified when it was found that while acetylation of dilute solutions of sulfanilamide by treatment with acetic anhydride abolished the diazo reaction, similar treatment of 4-hydroxylaminobenzene sulfonamide or 4-hydroxylaminobenzoic acid caused them to react more promptly to diazotization. Dilute aqueous solutions of these hydroxylamine compounds (0.1 to 1 mg. percent) under the conditions of our experiments react slowly and irregularly to diazotization,[2] and, when ammonium sulfamate is used to destroy the excess of nitrous acid, only slight color is produced by them. However, when acted upon by acetic anhydride the diazo reaction occurs promptly. This is brought about specifically by the anhydride, for equal amounts of glacial acetic acid do not produce this effect. The chemical basis for this effect requires further investigation. This action of acetic anhydride, which forms the principle of the test for aromatic hydroxylamines, was entirely unexpected; all of the evidence so far obtained indicates the specificity of this reaction.

Another characteristic shown by these hydroxylamine derivatives was that in spite of the fact that treatment with acetic anhydride

[2] 4-Hydroxylaminobenzoic acid and one preparation of 4-hydroxylaminobenzene sulfonamide reacted slowly, while another preparation reacted more promptly

accelerates the diazo reaction, this treatment abolishes the positive reaction to Ehrlich's p-dimethylaminobenzaldehyde reagent.

A further characteristic of the aromatic hydroxylamines which we have observed by means of the above test is their extreme sensitivity to alkali. Dilute solutions in acid titrated with sodium hydroxide, with phenolphthalein as an indicator, will be largely decomposed as a result of this treatment. Likewise the addition of a drop of dilute NaOH to an aqueous solution will promptly cause darkening of the solution and abolish the color reactions. However, when sodium bicarbonate is employed instead of sodium hydroxide very little destruction of the hydroxylamine results.

TEST FOR AROMATIC HYDROXYLAMINES

To carry out tests upon solutions containing sulfanilamide or related aromatic compounds containing a free amino group, the solution is made neutral to litmus with acetic acid or sodium bicarbonate (acetylation will not occur in the presence of strong mineral acids) and diluted so that 50 cc. contains not more than 1 to 4 mg. of total sulfanilamide. To 50 cc. in a small flask is added 1 cc. of acetic anhydride and the solution thoroughly mixed for 1 minute. Care must be taken that all parts of the solution (including that around the stopper) are acted upon by the acetic anhydride. For the estimation of sulfanilamide or other amino compounds under comparable conditions, 1 cc. of glacial acetic acid is used in place of acetic anhydride. The solution is permitted to stand for 30 minutes after the addition of acetic anhydride. To 10 cc. is now added 0.4 cc. of normal HCl (3.65 percent) and diazotization carried out by Marshall's (*9*) method:

One cc. of 0.1 percent sodium nitrite, mix and wait 3 minutes.

One cc. of 0.5 percent ammonium sulfamate, mix and wait 2 minutes. We have found the sulfamate essential in our procedure.

Five cc. of 0.4 percent alcoholic solution of dimethyl alpha-naphthylamine, wait 5 to 60 minutes and read in a colorimeter against suitable standards.

One cc. of 0.1 percent aqueous N-(1-naphthyl) ethylenediamine dihydrochloride has been used instead of the alpha-naphthylamine, as recently described by Bratton and Marshall (*10*). It has been satisfactory with the exception that slightly more color is at times produced in control samples.

Up to the present the procedure has been applied chiefly to urines containing sulfanilamide and the following standards and controls have been employed:

(1) A control solution containing the urine obtained before sulfanilamide administration, diluted 1 to 50 or 1 to 100.

(2) Fifty cc. of this solution plus 1 to 4 mg. of sulfanilamide (from solution freshly prepared or kept on ice).

(3) Three standards consisting of solution (2), to which are added 0.05 mg., 0.1 mg., and 0.25 mg. of p-hydroxylaminobenzene sulfonamide or p-hydroxylaminobenzoic acid.[3]

These solutions were treated in the same manner as the unknowns.

TEST FOR FURTHER OXIDATION PRODUCTS (HYDROXYLAMINO TO NITRO DERIVATIVES INCLUSIVE)

To 20 cc. (or other aliquot) of the solutions which have stood with acetic anhydride for 30 minutes, but to which HCl has not been added, approximately 0.5 gm. of powdered zinc metal (zinc dust) is added in a large test tube, and the tube immersed in boiling water for 10 minutes. It is then cooled, made up to volume and filtered. To 10 cc. of the filtrate 0.4 cc. of N/1HCl is added, and diazotization carried out as described above.

This procedure as it stands is only qualitative. While good recovery of 4-nitrobenzene sulfonamide, 4-nitro- and 4-nitrosobenzoic acid was obtained, only partial recovery occurred with 4,4′-azoxy- and 4,4′-azobenzoic acid. Also at times increase in the amount of color given by the hydroxylamino derivatives was noted as a result of this treatment, and a slight amount of color frequently resulted in the sulfanilamide-containing controls, presumably as a result of hydrolysis of the acetylated compound. Another difficulty was that the color given by the urines under test was often difficult to match with the standards.

RESULTS IN AQUEOUS SOLUTIONS

The procedure for aromatic hydroxylamines gave no color, or only traces of color, with the following compounds in final concentration up to 8 mg. percent in aqueous solution:

Sulfanilamide, acetyl sulfanilamide, 4-nitrobenzene sulfonamide, sulfapyridine (2-sulfanilyl aminopyridine), sulfanilic acid, atoxyl, aniline, p-phenylenediamine, 4-aminophenol, 4-aminobenzoic acid, 4,4′-azobenzoic acid, 4,4′-azoxybenzoic acid, 4-nitrosobenzoic acid, 4-nitrobenzoic acid, hydroxylamine hydrochloride ($NH_2OH.HCl$).

4-4′-Diaminodiphenylsulfone was not completely acetylated by this procedure and gave considerable color both to diazotization and to Ehrlich's aldehyde reagent. To get complete acetylation of this compound it was found necessary to add acetic anhydride in two stages. To 50 cc. of a solution containing 5 mg. or less of 4,4′-diaminodiphenylsulfone 1 cc. of acetic anhydride is added and let stand 30 minutes. Five cc. of this solution is diluted to 50 cc. and the procedure repeated. By this method a negative diazo reaction may be obtained.

[3] p-Hydroxylaminobenzoic acid and p-hydroxylaminobenzene sulfonamide were prepared by reduction of the corresponding nitro compounds according to the method of E. Bamberger and F. L. Pyman (Ber. d. Deutsch. Chem. Ges., 42:230 (1909)).

Two samples of 4-hydroxylaminobenzene sulfonamide gave 60 and 63 percent of the color when compared with 4-hydroxylaminobenzoic acid (theoretical, on a molar basis=81 percent), but the colors were of slightly different shade. Whether these lower values are due to differences in chromogenic properties or to impurities in the former compound remains to be determined.

REDUCTION OF 4-NITROSOBENZOIC ACID BY CYSTEINE AND ASCORBIC ACID

When tests for hydroxylamine were carried out in urines to which the above compounds were added it was found that results similar to those in aqueous solutions were obtained, with the exception of 4-nitrosobenzoic acid. This compound reacted negatively in aqueous solutions but gave a positive reaction when added to freshly collected samples of urine. It was found that the addition of ascorbic acid to dilute aqueous solutions of this compound caused a prompt and almost complete reduction to the hydroxylamine; no aminobenzoic acid was detected (table 1). When cysteine or glutathione was added to 4-nitrosobenzoic acid the reduction was partially to the hydroxylamine and partially to the amine. It is, therefore, seen that the positive reaction which occurs when the nitroso compound is added to urine is attributable to reduction by the ascorbic acid present.

TABLE 1.—*Reduction of 4-nitrosobenzoic acid by ascorbic acid, by cysteine, and by glutathione solutions at room temperature for 30 minutes. Comparisons made with standard solutions of 4-aminobenzoic acid and 4-hydroxylaminobenzoic acid treated similarly. Percentages calculated on a basis of molecular weight. 0.8 cc. of N/1 HCl needed in carrying out diazo tests because of buffer present*

	Percent reduced to 4-aminobenzoic acid	Percent reduced to 4-hydroxylaminobenzoic acid
0.1 mg. 4-nitrosobenzoic acid 2.0 cc. phosphate buffer pH 7.4 1.0 mg. ascorbic acid, made up to 10 cc. in water	[1] Trace	91
As above, with 1.0 mg. cysteine hydrochloride	[1] 33	68
As above, with 1.0 mg. SH glutathione	[1] 34	65

[1] Probably excessive because the hydroxylamine present gives some color.

TESTS UPON BLOOD

Most of the protein precipitants were found unsatisfactory for the extraction of the aromatic hydroxylamines from the blood. It was also discovered that with the acid precipitants the hydroxylamine was being destroyed by the sodium hydroxide used to neutralize the solution. Trichloracetic acid was the most satisfactory precipitant, and when neutralization was carried out with sodium bicarbonate

from one-half to two-thirds of the added hydroxylamine could be recovered from blood serum.

Mayer (*3*) has shown that 4-hydroxylaminobenzene sulfonamide rapidly oxidizes hemoglobin to methemoglobin, the hydroxylamine being reduced to the amine during the process. Heubner (*11*), however, states that azoxybenzol is formed from the interaction of hemoglobin with β-phenyl hydroxylamine. In accordance with this it has not been possible to recover any added hydroxylamine from whole blood. However, it is possible to add the hydroxylamine to oxalated whole blood or plasma and to obtain partial recovery from the plasma if care is taken to avoid hemolysis and if tests are performed within a short time after the addition.

Two cc. of plasma from oxalated blood, as free as possible from hemolysis, are measured into a large test tube and mixed with 13 cc. of water; 5 cc. of 20 percent trichloracetic acid are added and mixed. The filtrate is carefully neutralized with powdered sodium bicarbonate; tests are then carried out as described above.

PRELIMINARY TESTS UPON ANIMALS FOLLOWING THE ORAL ADMINISTRATION OF SULFANILAMIDE

Catheterized samples of urine were made slightly acid with 10 percent acetic acid. When collected from animals kept in metabolism cages enough acetic acid was placed in the receptacle to insure an acid reaction.

Tests have been carried out upon human beings, dogs, rabbits, and rats. Oxidation products of sulfanilamide have been detected in all the urines which we have studied.

Results are shown in tables 2, 3, 4, and 5. It is of interest that the dog, in which acetylation of sulfanilamide does not occur, and the rat, in which there were only small percentages of acetylation in our experiments, gave lower values for hydroxylamine excretion than man and the rabbit, in which high percentages of acetyl sulfanilamide appear in the urine. The significance of this observation is not known. Confirmatory evidence that we are dealing with the hydroxylamine derivative in the urine was found in the behavior towards Ehrlich's dimethylaminobenzaldehyde reagent and in the sensitivity towards alkali of the compound giving the color reaction. However, the substance responsible for the color test in the urine is much more stable than aqueous solutions of the hydroxylamines. It was found that certain constituents of the urine, notably ascorbic acid and sulfhydryl compounds, markedly stabilize solutions of the hydroxylamines.

TABLE 2.—*Presence in the urine of 3 rabbits of a hydroxylamine derivative of sulfanilamide following the oral administration of 1.5 gm. of sulfanilamide in 100 cc. of water*

Rabbit weight (kilo)	Time after drug (hours)	Urine				Blood plasma	
		Volume (cc.)	Free sulfanilamide (mg.)	Total sulfanilamide (mg.)	Hydroxylamine sulfanilamide (mg.) [1]	Free sulfanilamide (mg. percent)	Hydroxylamine sulfanilamide
2.8	2	30	30	60	0.45		
	4	93	93	177	2.14		
	6	25	87	188	2.4		
2.65	2	52	52	78	1.0		
	4	45	45	95	2.1		
	6	28	56	126	2.8		
2.5	2	21	35		2.1	25	0
	4	20	30		2.4	20	0
	6					15	0

[1] In these experiments 4-hydroxylaminobenzoic acid was used as a standard. The values are only approximate, as the samples of 4-hydroxylaminobenzene sulfonamide so far prepared have yielded colors 60 to 63 percent lower than the above standard.

TABLE 3.—*Presence in the urine of dogs of only small amounts of hydroxylamine derivative following the oral administration of sulfanilamide*

Dog weight (kilo)	Oral dose of sulfanilamide (gm.)	Time after drug (hours)	Urine			Blood plasma	
			Volume (cc.)	Sulfanilamide (mg.)	Hydroxylamine sulfanilamide (mg.)	Sulfanilamide (mg. percent)	Hydroxylamine sulfanilamide
20	5.0	2	100	250	Trace		
		4	227	1,135	Trace		
		6	43	800	1.5		
		24	[1] 155	1,550	Trace		
11.9	6.0	2	220	220	Neg.	40	Neg.
		4	115	690	Large trace	33	Neg.
		6	35	350	4.9	33	Neg.

[1] Obtained by catheter. Reaction alkaline. No urine voided during night.

TABLE 4.—*Aromatic hydroxylamine in the urine of rats following 1.2 gm. per kilo of sulfanilamide orally. Groups of 2 rats kept in small metabolism cages*

Rats weight (gm.)	Time after drug (hours)	Urine				Blood plasma	
		Volume (cc.)	Free sulfanilamide (mg.)	Total sulfanilamide (mg.)	Hydroxylamine sulfanilamide (mg.)	Free sulfanilamide (mg. percent)	Hydroxylamine sulfanilamide
250	2	12.5	43	43	Trace		
230	4	7	29.4	35	0.35		
	6	3	25	28.5	.6		
	24	55	220	244.5	1.92		
240	2	12	26.0	28.3	Trace		
230	4	6.5	37.2	47.3	.32		
	6	4.5	26.6	34.2	.45		
	24	45	171	225	1.8		
240	2	10	26.6	26.6	Trace		
260	4	6	36	41.3	.42		
	6	5.5	44	49	.55	30	Neg.

TABLE 5.—*Hydroxylamine derivative in single specimen of urine from afebrile patients (gonorrhea) on sulfanilamide therapy. (Obtained through the courtesy of Dr. P. J. McNamara of the U. S. Naval Hospital)*

Patient	Sulfanilamide therapy oral (gm.)	Urine	
		Free sulfanilamide (mg. per cent)	Hydroxylamine sulfanilamide (mg. percent)[1]
Mart	2.66 for 20 days	100	1.25
Gor	4.0 for 17 days 2.66 for 6 days	100	3.5
Spg	4.5 for 2 days 8.0 for 2 days	300	10
Pot	4.5 for 2 days 8.0 for 3 days 5.3 for 1 day No drug for 2 days	75	1.2
Huf	2.66 for 6 days	90	1.75

[1] 4-Hydroxylaminobenzoic acid was used as standard.

Qualitative tests for further oxidation products in the urine have shown little or none in man and in the rabbit, but in the dog and rat positive evidence of their presence was found, particularly at later intervals (6 to 24 hours) after the administration of sulfanilamide.

We have so far been unable to detect either hydroxylamines or further oxidation products in the oxalated blood plasma of the rabbit, rat, or dog. Whether or not this is a result of technical difficulties remains to be determined.

DISCUSSION

The reduction of aromatic nitro compounds to amino compounds by the body is well known. Amino compounds are demonstrable in the urine following the administration of nitrobenzene derivatives.[4]

In spite of the importance in therapeutics of aminobenzene derivatives, little is known concerning the oxidation of the amino group in the body. Heubner and Schwedtke (*11*) have suggested that aniline is oxidized to p-aminophenol, with p-phenylhydroxylamine as a probable intermediate. The only actual demonstration of an oxidation product of the aromatic amino group in the body is that of Ellinger (*12*), who isolated a small amount of a substance with characteristics of acetylphenylhydroxylamine from the blood of cats following large doses of acetanilide. Brownlee (*13*) and Rimington (*14*) have recently discussed this problem in relation to pigment metabolism.

It is believed that the procedures which we have developed can be applied to the study of many benzene derivatives containing amino

[4] W. Lipschitz has shown that excised tissues can reduce dinitrobenzene, with the formation of a hydroxylamine derivative (Zeit. f. Physiol Chem., 109: 189 (1920))

groups susceptible to acetylation in the test tube, and to diazotization (or other method of detection).[5]

The possibility that the hydroxylamine derivative of sulfanilamide is an important agent in the mechanism of therapeutic action, as suggested by Mayer (*3*) and by Main, Shinn, and Mellon (*8*), is given added support by the demonstration of this compound in the urine. Efforts to correlate the presence of the hydroxylamine with bacteriostatic or bactericidal effects should be made.

The oxidation products of the amino group are of increased toxicity. Thus we (*5*) have found that on subcutaneous injection 4-hydroxylaminobenzoic acid and 4,4′-azoxybenzoic acid were 4 times as toxic as 4-aminobenzoic acid; 4,4′-azobenzoic acid was 20 times and 4-nitrosobenzoic was 50 times as toxic as 4-aminobenzoic acid. The relation of the oxidation products of the amino group to toxicity of aminobenzene derivatives therefore deserves further study. Their relation to deranged pigment metabolism has already been suggested by the work of Ellinger (*12*), Heubner (*11*), Rimington (*14*), and Brownlee (*13*).

With the controlled conditions under which we have applied the methods for detection of oxidation products of aromatic amino groups, we have reason to place confidence in the results obtained. All of the evidence gathered so far has indicated the specificity of the reaction for the aromatic hydroxylamines. As with all colorimetric procedures, however, final proof of specificity requires extensive study.

SUMMARY

Colorimetric methods have been developed for the detection of aromatic hydroxylamines and for further oxidation products of the amino group of aminobenzene derivatives. The procedure can be applied to solutions containing sulfanilamide or other aminobenzene compounds.

Following the oral administration of sulfanilamide to the rat, rabbit, dog, and to man, the hydroxylamine derivative has been demonstrated in the urine. Smaller percentages occurred in the rat and dog; in these animals qualitative tests for further oxidation products of the amino group of sulfanilamide were obtained in the urine.

The reduction *in vitro* of 4-nitrosobenzoic acid to 4-hydroxylaminobenzoic acid and to 4-aminobenzoic acid by glutathione and cysteine was shown. With ascorbic acid the reduction was almost entirely to the hydroxylamine.

The significance of these results in explaining the mechanism of action and toxicity of sulfanilamide is discussed.

[5] Before application of these methods to other compounds the behavior of each compound must be carefully studied. For example, with dilute solutions of the highly unstable Beta phenylhydroxylamine, C_6H_5NHOH, the characteristic effect of acetic anhydride in bringing about a diazo reaction is present for only a few minutes after addition of acetic anhydride.

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PROVISIONAL MORTALITY RATES FOR THE FIRST SIX MONTHS OF 1939

The mortality rates in this report are based upon preliminary data for 42 States, the District of Columbia, Alaska, and Hawaii for the first 6 months of 1939. Comparative data for 40 States (District of Columbia included as a State) are presented for the first 6 months and by the 2 quarters of 1937–39.

This report is made possible through a cooperative arrangement with the respective States, which voluntarily furnish provisional quarterly and annual tabulations of current birth and death records. These reports are compiled and published by the United States Public Health Service.

Because of lack of uniformity in the method of classifying deaths according to cause, and because a certain number of certificates were not filed in time to be included, these data may differ in some instances from the final figures subsequently published by the Bureau of the Census.

In the past, these preliminary reports have provided an early and accurate index of the trend in mortality for the country as a whole. Some deviation from the final figures for individual States is to be

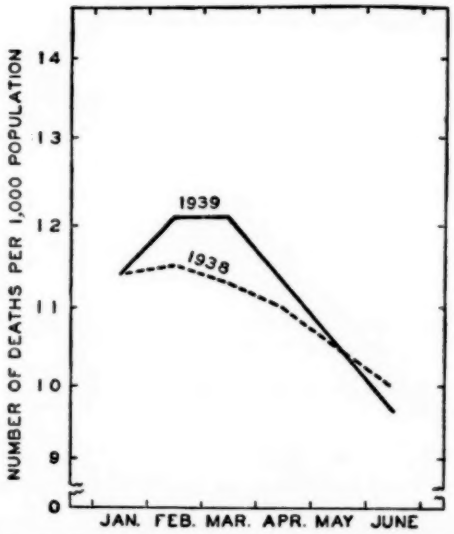

FIGURE 1.—Death rate per 1,000 population, by months, 1938 and 1939

expected, because of the provisional nature of the information. It is believed, however, that the trend of mortality within each State is correctly represented. Comparisons of specific causes of death among different States are subject to error because of differences in tabulation procedure and completeness of reporting. Comparisons of this nature should be made only from the final figures published by the Bureau of the Census.

Although the death rate from all causes, 11.2 per 1,000 estimated population, for the first 6 months of 1939 was 2.8 percent higher than the corresponding rate, 10.9, for 1938, the health of the Nation, insofar as it is measured by mortality rates, has been well above the average of immediately preceding years. Some increase in the death rate compared with that for last year was to be expected, since the

lowest rate in the history of the death registration area was recorded in 1938. The mortality rate from all causes during the current half year is 6 percent less than the corresponding rate for 1937. Even though the increase in mortality was slight, it was fairly widespread. Twenty-five of the forty States (including the District of Columbia) for which comparable data are available reported a higher rate in 1939 than in 1938.

The cause of death with the largest numerical increase was heart disease, which accounted for 8 percent more deaths than in the previous year. Influenza, with an increase of 65 percent over the first 6 months of 1938, registered the largest relative increase. However, the influenza death rate for the first 6 months of 1938, 14.5 per 100,000 population, was unusually low, so that the rate for 1939, 23.9 per 100,000 population, was still low when compared with the average of preceding years and, indeed, was only slightly more than one-half the rate for 1937.

Decreases of varying magnitude were reported for the other causes of death shown in the accompanying table. The death rate from the principal communicable diseases of childhood, measles, diphtheria, scarlet fever, and whooping cough, was appreciably less than for last year. Especially gratifying were the continued declines in the mortality rates from tuberculosis and diseases of pregnancy and childbirth. The death rate from tuberculosis, 47.3 per 100,000 population, decreased 3 percent and will apparently be definitely below 50 per 100,000 population at the end of the year. The maternal mortality rate reached a new low of 4 per 1,000 live births; this represents a decline of 23 percent since 1937.

The infant-mortality rate registered a drop of 2 percent and will be less than 50 per 1,000 live births for the first time in the history of the registration area if the present favorable conditions continue until the end of the year.

The birth rate, 16.2 per 1,000 population, was slightly less than the rate for 1938, 16.5 per 1,000 population. Owing to the combination of an increase in the death rate and a decrease in the birth rate, the crude rate of natural decrease fell from 5.6 in 1938 to 5.0 per 1,000 population for the current half year.

Provisional mortality from certain causes in the first 6 months of 1939, with comparative provisional data for the corresponding period in preceding years

State and period	All causes, rate per 1,000 population (annual basis)	Births (exclusive of stillbirths) per 1,000 population (annual basis)	Rate per 1,000 live births		Death rate per 100,000 population (annual basis)																				
			Total infant mortality	Maternal mortality	Typhoid and paratyphoid fever (1, 2)	Measles (7)	Scarlet fever (8)	Whooping cough (9)	Diphtheria (10)	Influenza (11)	Acute poliomyelitis and polioencephalitis (16)	Encephalitis, epidemic or lethargic (17)	Epidemic cerebrospinal meningitis (18)	Tuberculosis, all forms (23–32)	Cancer, all forms (45–53)	Diabetes (59)	Cerebral hemorrhage, apoplexy (82a, b)	Diseases of the heart (90–93)	Pneumonia, all forms (107–109)	Diseases of the digestive system (115–129)	Diarrhea and enteritis, under 2 years (119)	Nephritis (130–133)	All accidents (176–194, 201–214)	Automobile accidents (206, 208, 210)
40 STATES [1]																									
January–June:																									
1939	11.2	16.2	50	4.0	0.7	1.3	0.9	2.4	1.2	23.9	0.2	0.4	0.6	47.3	120.0	27.4	92.1	301.9	78.4	57.3	4.9	78.7	67.5	20.6
1938	10.9	16.5	51	4.4	.9	4.2	1.3	3.8	1.5	11.5	.3	.6	.9	48.9	117.6	24.8	87.4	280.6	81.6	60.7	7.0	83.0	66.4	21.3
1937	11.9	15.8	57	5.2	.9	1.0	2.1	3.2	1.6	45.1	.3	.6	2.3	54.8	113.6	25.5	90.7	286.1	112.8	62.8	5.9	83.3	76.6	26.5
January–March:																									
1939	11.9	16.1	54	4.1	.6	1.3	1.2	2.4	1.6	31.5	.2	.5	.7	46.8	120.3	29.4	97.0	323.0	104.7	56.1	3.9	83.1	65.8	20.1
1938	11.3	16.4	52	4.4	.7	3.9	1.6	3.4	1.9	20.7	.3	.6	1.1	48.5	117.2	26.1	90.9	292.5	103.5	56.6	4.1	82.1	65.9	21.5
1937	13.0	15.5	64	5.6	.8	.8	2.6	3.1	2.0	71.2	.3	.7	2.7	55.5	114.0	28.4	96.9	308.5	150.2	60.8	4.4	86.7	75.0	26.4
April–June:																									
1939	10.5	16.3	45	4.0	.8	1.3	.7	2.4	.7	16.4	.3	.4	.5	47.7	119.6	25.5	87.2	281.1	52.3	58.4	5.8	74.4	69.1	21.2
1938	10.5	16.7	50	4.3	1.0	4.5	1.0	4.2	1.0	8.4	.3	.6	.8	49.3	117.9	23.6	84.1	268.7	56.9	64.8	9.7	77.9	68.9	21.1
1937	10.9	16.2	50	4.8	1.0	1.2	1.6	3.2	1.1	19.2	.3	.6	1.9	54.1	113.1	22.7	84.6	263.5	75.9	64.8	7.3	80.0	78.1	26.7
Metropolitan Life Insurance Co., industrial policyholders, ages 1 and over (January–June): [3]																									
1939	8.3	-----	-----	-----	.5	1.0	1.0	1.9	1.2	15.7	-----	-----	-----	46.9	99.4	28.7	63.4	[3] 173.5	60.2	-----	[4] 4.6	[5] 55.1	44.3	15.6
1938	8.1	-----	-----	-----	.8	2.9	1.7	2.2	1.7	9.9	-----	-----	-----	49.0	96.1	26.2	61.1	[3] 162.3	66.0	-----	[4] 5.9	[5] 56.1	45.4	16.2
1937	9.0	-----	-----	-----	.6	1.4	2.1	3.1	1.8	30.4	-----	-----	-----	54.8	93.4	27.1	62.2	[3] 173.3	93.8	-----	[4] 5.6	[5] 53.8	50.2	19.1
Alabama:																									
1939	10.1	20.3	65	6.4	1.2	3.2	.5	5.8	1.8	50.1	0.6	0.3	1.1	52.0	58.2	12.5	71.1	164.4	87.5	52.2	10.8	64.4	60.7	18.3
1938	10.7	21.2	65	6.6	1.7	10.4	.7	6.9	2.3	36.2	.5	.8	3.1	57.2	54.8	11.9	71.2	167.7	91.5	69.1	19.6	78.9	64.2	18.0
1937	11.4	20.8	71	6.6	1.2	.1	.3	6.5	2.4	82.8	.6	.3	5.2	65.3	57.1	11.0	68.5	164.9	117.0	57.0	13.1	79.4	70.3	20.2
Alaska:																									
1939	13.6	23.6	76	2.6	(*)	(*)	18.6	34.1	3.1	31.0	(*)	3.1	(*)	381.6	83.8	6.2	71.4	220.3	155.1	46.5	(*)	31.0	142.7	(*)
1938	24.0	31.6	85	6.4	3.2	3.2	3.2	96.0	(*)	67.2	(*)	(*)	(*)	582.6	96.0	(*)	182.4	252.9	284.9	51.2	(*)	16.0	227.3	(*)
1937	18.8	22.7	141	13.3	(*)	6.7	3.4	37.0	(*)	53.8	(*)	(*)	6.7	379.8	67.2	6.7	60.5	369.7	194.9	63.8	10.1	23.5	164.7	(*)

See footnotes at end of table.

Provisional mortality from certain causes in the first 6 months of 1939, with comparative provisional data for the corresponding period in preceding years—Continued

State and period	All causes, rate per 1,000 population (annual basis)	Births (exclusive of stillbirths) per 1,000 population (annual basis)	Rate per 1,000 live births		Death rate per 100,000 population (annual basis)																		
			Total infant mortality	Maternal mortality	Typhoid and paratyphoid fever (1, 2)	Measles (7)	Scarlet fever (8)	Whooping cough (9)	Diphtheria (10)	Influenza (11)	Acute poliomyelitis and polioencephalitis (16)	Encephalitis, epidemic or lethargic (17)	Epidemic cerebrospinal meningitis (18)	Tuberculosis, all forms (23–32)	Cancer, all forms (45–53)	Diabetes (59)	Cerebral hemorrhage, apoplexy (82a, b)	Diseases of the heart (90–95)	Pneumonia, all forms (107–109)	Diseases of the digestive system (115–129)	Diarrhea and enteritis, under 2 years (119)	Nephritis (130–132)	All accidents (176–194, 201–214)	Automobile accidents (206, 208, 210)
40 STATES—continued																							
California:																							
1939	12.4	15.8	42	3.1	0.6	1.7	0.5	0.9	1.1	4.8	0.4	0.2	0.6	65.1	150.9	27.6	93.3	379.9	58.2	76.0	6.1	79.2	91.8	40.9
1938	12.5	15.9	44	3.5	1.2	1.4	.6	2.8	1.6	5.5	.2	.6	1.1	69.8	146.5	25.0	91.7	363.4	67.4	75.2	7.9	86.2	89.0	38.7
1937	14.2	14.5	51	4.4	.8	.9	1.0	5.3	1.9	37.4	.4	.6	2.6	82.0	140.2	28.9	90.7	406.5	110.4	81.7	7.7	89.2	104.7	46.8
Colorado:																							
1939	12.1	18.9	60	5.7	1.1	2.2	1.5	7.3	3.2	32.0	.6	.4	.9	61.7	118.3	17.9	95.5	258.8	114.2	65.2	4.7	86.5	80.2	21.9
1938	11.9	18.7	53	4.6	1.3	5.1	1.3	3.0	3.9	17.6	.8	.8	3.8	67.2	119.1	18.8	91.0	246.3	117.0	74.1	6.6	87.8	80.7	26.1
1937	14.3	17.9	73	5.8	1.3	.2	.2	6.2	2.4	86.0	1.9	1.3	3.8	73.2	122.4	17.5	92.8	242.0	244.8	81.2	4.9	86.0	87.4	27.9
Connecticut:																							
1939	10.5	12.7	39	3.4	.2	.8	.3	1.5	.6	8.1	(*)	.1	(*)	39.1	137.0	30.4	88.4	282.0	62.5	49.2	1.8	82.4	55.5	16.0
1938	10.5	13.4	36	2.5	.2	(*)	.5	.6	.9	5.1	(*)	.2	.2	37.9	137.0	31.9	91.6	261.9	66.9	50.8	2.6	87.1	59.3	16.8
1937	10.9	12.6	45	3.3	.3	1.3	1.2	1.7	.9	20.0	(*)	.5	.9	38.8	125.6	34.8	86.0	246.1	89.9	49.9	3.6	87.6	64.4	21.8
Delaware:																							
1939	13.1	15.9	49	4.8	(*)	(*)	.8	2.3	1.5	17.6	(*)	2.3	2.3	64.4	123.4	36.8	122.7	411.8	102.0	47.5	3.8	121.1	62.9	23.8
1938	12.6	15.7	53	3.9	.8	1.5	.8	8.5	1.5	16.2	(*)	.8	4.3	43.9	127.0	31.6	110.8	384.1	97.8	57.7	6.2	120.1	73.1	24.6
1937	14.4	15.9	67	3.9	1.5	2.3	(*)	7.7	.8	36.3	(*)	(*)	3.1	55.6	108.9	30.9	103.5	385.5	129.8	66.4	7.0	144.5	106.6	39.4
District of Columbia:																							
1939	13.3	21.0	44	5.5	.3	.6	(*)	1.9	.6	14.1	(*)	.3	.9	70.6	158.4	26.7	82.8	360.7	85.3	73.1	5.6	115.7	76.8	20.4
1938	13.1	19.7	49	5.3	.3	.6	1.0	.6	1.0	6.4	(*)	1.0	2.5	74.9	137.2	22.5	87.6	353.4	108.9	69.5	7.6	112.1	67.0	19.1
1937	15.2	19.0	65	6.8	1.0	3.8	1.0	4.5	3.2	28.6	(*)	1.0	7.7	102.0	144.4	32.2	104.2	346.4	166.3	77.2	5.8	98.7	81.0	26.7
Florida:																							
1939	12.7	16.4	65	6.3	1.6	1.3	.4	4.2	1.5	34.8	.1	.2	.6	56.2	102.7	23.4	105.9	277.3	65.4	85.5	13.6	104.1	102.8	40.9
1938	12.9	16.1	62	7.8	3.4	2.5	.1	4.4	1.9	29.6	.4	.6	1.1	58.9	95.0	20.7	106.1	273.3	79.9	95.0	15.6	101.0	99.3	42.4
1937	13.1	15.9	64	7.4	3.4	.4	.1	3.3	2.4	54.2	.2	.4	6.6	60.4	96.7	20.4	108.1	253.6	81.1	94.5	13.4	103.4	107.5	41.4
Georgia:																							
1939	9.6	18.3	67	6.1	1.4	2.8	.3	3.4	1.3	40.5	.3	.1	.4	44.3	56.2	11.9	89.5	162.0	83.4	53.6	12.1	90.6	52.4	18.4
1938	10.7	19.0	73	6.7	2.2	7.9	.5	7.1	1.6	33.4	.4	.2	1.0	52.3	56.4	13.4	85.8	165.9	101.4	70.1	20.4	108.9	63.6	23.2
1937	10.9	18.7	66	7.7	2.0	.1	.3	3.4	2.0	70.0	.6	.2	1.7	49.9	54.1	11.2	84.7	167.4	107.8	63.4	12.9	104.1	62.9	25.7

Hawaii:																								
1939	7.2	18.1	62	3.3	1.7	(6)	(6)	6.9	1.3	5.2	(6)	.4	(6)	62.2	59.6	16.8	41.0	120.0	60.9	49.2	9.9	66.1	45.8	12.1
1938	7.3	20.0	58	2.8	1.3	.4	.4	5.7	.9	4.4	.9	.4	.9	61.2	61.2	15.8	51.5	111.8	62.1	53.7	16.3	60.8	53.3	12.8
1937	9.0	20.4	77	5.5	2.2	80.6	(6)	.9	3.6	8.6	(6)	(6)	.9	79.2	74.3	15.3	39.6	115.2	100.4	66.6	20.7	70.2	53.1	14.8
Idaho:																								
1939	9.9	22.1	48	2.7	2.8	1.6	.8	2.4	.8	28.0	.4	1.2	2.0	21.2	94.6	25.2	67.1	265.2	75.9	56.3	2.8	41.9	85.5	26.0
1938	9.2	22.2	43	3.6	2.4	1.2	.8	4.4	(6)	20.6	(6)	1.6	2.0	22.6	77.0	10.1	73.0	180.7	92.0	58.9	1.6	46.8	73.0	27.0
1937	10.7	21.0	46	3.5	1.2	5.3	2.0	2.4	.4	69.1	(6)	1.2	1.2	22.5	80.2	11.0	75.7	174.2	96.9	69.9	4.0	35.6	87.9	30.7
Illinois:																								
1939	11.7	14.2	42	3.3	.2	.1	1.4	2.4	1.7	21.4	.2	.2	.2	49.8	140.2	31.4	78.4	364.7	71.3	60.5	2.3	102.2	63.4	23.0
1938	11.0	14.6	43	3.4	.4	5.2	2.4	1.2	1.7	6.9	.1	.4	.3	47.9	132.9	28.7	75.4	322.0	69.3	61.7	3.9	97.8	66.1	22.3
1937	11.9	13.3	50	4.5	.2	.2	3.2	2.1	2.2	30.2	.2	.3	1.8	53.6	128.4	28.4	75.7	309.3	92.8	69.2	3.1	103.7	76.0	30.0
Indiana:																								
1939	11.7	15.1	45	4.4	1.0	.2	2.0	1.5	1.5	44.2	(6)	.6	.5	42.4	111.6	17.0	138.2	262.0	94.8	(7)	3.3	65.0	65.3	23.8
1938	10.9	15.6	43	4.7	.2	5.8	2.2	1.7	2.0	14.9	.4	.6	1.1	40.5	111.4	17.0	122.5	242.5	79.1	(7)	4.5	64.7	64.6	26.6
1937	12.0	13.8	57	4.1	.4	.6	4.4	4.6	1.3	54.9	.3	.5	2.3	49.2	104.8	16.1	123.9	264.3	124.1	(7)	4.8	68.6	77.0	34.6
Iowa:																								
1939	10.5	16.0	41	2.3	.5	1.9	1.6	1.6	.4	41.2	.2	.5	.5	18.5	121.9	27.5	110.3	286.8	68.7	55.4	2.1	58.0	62.0	16.9
1938	9.8	16.5	39	3.3	.4	1.6	2.8	3.2	.9	15.5	.5	.8	.7	20.0	127.5	21.7	104.8	249.7	73.4	55.6	2.4	61.2	57.9	14.4
1937	10.1	14.8	46	5.2	.4	.1	5.8	2.2	.2	56.3	.3	.9	1.1	21.2	119.1	21.6	105.9	225.8	84.1	51.5	2.9	62.7	71.4	18.4
Kansas:																								
1939	10.1	14.4	42	4.3	.4	.2	.8	.4	.6	26.2	.1	1.4	.2	24.7	119.0	28.0	89.9	260.8	58.2	54.2	2.2	99.7	89.7	18.7
1938	10.2	14.8	47	4.7	.4	2.3	1.7	3.8	.5	19.7	(6)	.8	.4	24.5	116.2	24.9	96.1	238.5	63.5	58.5	2.8	100.3	99.0	20.8
1937	11.1	14.1	49	4.7	(6)	.1	6.3	1.1	1.5	58.0	.3	1.2	1.7	28.6	114.8	24.6	106.6	251.7	86.1	59.7	3.6	92.2	107.1	21.7
Maine:																								
1939	13.5	17.0	57	4.6	1.4	.7	.5	4.4	3.5	32.1	1.4	.2	.2	34.2	150.1	26.3	131.1	402.6	99.9	52.5	4.0	86.3	62.6	14.8
1938	12.3	17.5	51	4.8	1.6	2.8	(6)	2.6	1.4	22.8	.7	.2	(6)	29.6	142.4	28.9	113.3	335.4	95.2	56.4	5.4	85.1	55.7	13.4
1937	14.2	18.8	60	5.2	.9	.2	.7	1.9	.5	65.7	.5	.2	.9	34.6	145.6	23.8	125.3	395.1	126.7	57.9	5.4	95.9	60.1	13.4
Maryland:																								
1939	13.3	16.5	52	3.5	.6	1.8	.2	1.2	1.3	15.5	(6)	.6	.8	80.7	143.3	32.4	112.0	363.9	97.0	53.2	4.9	137.7	73.0	20.5
1938	12.7	17.0	56	3.8	.8	.7	1.0	4.6	.8	10.5	(6)	1.4	1.0	81.5	134.1	30.0	101.4	340.2	102.5	55.0	5.9	137.4	65.9	19.9
1937	14.0	16.1	65	3.8	.6	4.2	1.1	6.1	1.8	27.4	.4	1.9	3.7	88.5	131.6	27.1	117.6	332.1	144.0	62.7	7.4	152.3	86.6	29.1
Massachusetts:																								
1939	11.3	(7)	(7)	(7)	.3	.6	.5	1.5	.2	8.2	(6)	.3	.6	36.3	145.5	34.9	100.9	399.0	89.8	51.2	1.7	64.4	53.5	11.4
1938	11.7	(7)	(7)	(7)	.3	.2	1.0	1.0	.3	5.0	.2	.2	.4	39.8	156.8	34.4	99.5	386.3	93.9	55.6	2.2	72.2	53.4	12.8
1937	12.6	(7)	(7)	(7)	(6)	1.3	1.4	2.8	.4	16.7	(6)	.3	2.5	43.8	148.9	37.8	100.7	391.8	132.4	64.6	2.6	77.4	62.4	17.9
Michigan:																								
1939	11.4	18.7	45	3.5	.4	1.1	2.2	1.9	.7	27.7	(6)	.2	.4	41.2	123.7	30.4	94.2	330.1	78.3	60.9	3.7	62.5	68.4	22.3
1938	10.6	19.1	45	3.5	.6	3.7	2.6	1.9	.8	8.1	.1	.3	.5	40.7	116.7	27.7	90.8	297.3	69.9	58.2	4.3	58.4	62.8	22.3
1937	11.8	18.0	55	3.8	.4	.2	4.5	2.7	1.0	31.4	(6)	.3	1.1	46.9	115.5	27.0	91.1	291.2	112.7	64.2	3.9	66.2	80.1	33.4
Minnesota:																								
1939	10.5	18.2	40	2.9	.1	4.4	.7	.6	.4	21.1	.1	.2	.3	32.7	141.4	29.4	99.5	279.5	76.2	58.8	3.2	44.6	64.8	15.7
1938	9.8	17.6	40	3.5	.2	.7	1.7	2.7	.3	10.5	.2	.4	.4	30.4	140.0	26.1	88.2	250.4	76.9	52.1	1.9	44.9	62.4	19.4
1937	10.7	18.4	43	3.4	.3	.2	2.4	2.1	.4	43.2	(6)	.9	1.5	37.0	141.2	24.7	91.6	241.4	98.2	55.3	2.1	48.4	65.9	17.1
Missouri:																								
1939	11.7	15.9	45	3.7	1.1	.2	1.2	1.9	2.0	31.9	.5	.4	.6	47.6	123.6	25.1	94.7	277.1	106.0	58.4	4.4	113.9	64.6	19.2
1938	11.6	15.4	52	3.7	1.4	9.2	3.1	5.3	3.0	23.6	.6	.6	.6	51.8	125.3	24.0	91.2	276.7	114.5	57.4	6.4	107.5	67.6	22.4
1937	12.9	13.1	68	6.5	2.7	.1	4.1	3.0	2.4	63.2	.4	.8	1.8	60.6	122.9	25.1	99.8	282.5	165.9	58.3	5.2	109.8	80.2	27.3

See footnotes at end of table.

Provisional mortality from certain causes in the first 6 months of 1939, with comparative provisional data for the corresponding period in preceding years—Continued

State and period	All causes, rate per 1,000 population (annual basis)	Births (exclusive of stillbirths) per 1,000 population (annual basis)	Rate per 1,000 live births		Death rate per 100,000 population (annual basis)																	
			Total infant mortality	Maternal mortality	Typhoid and paratyphoid fever (1, 2)	Measles (7)	Scarlet fever (8)	Whooping cough (9)	Diphtheria (10)	Influenza (11)	Acute poliomyelitis and polioencephalitis (16)	Encephalitis, epidemic or lethargic (17)	Epidemic cerebrospinal meningitis (18)	Tuberculosis, all forms (23–32)	Cancer, all forms (45–53)	Diabetes (50)	Cerebral hemorrhage, apoplexy (82a, b)	Diseases of the heart (90–95)	Pneumonia, all forms (107–109)	Diseases of the digestive system (115–129)	Diarrhea and enteritis, under 2 years (119)	Nephritis (130–132)	All accidents (176–194, 201–214)	Automobile accidents (206, 208, 210)
40 STATES—continued																								
Montana:																								
1939	11.0	19.5	58	3.6	1.1	5.9	1.5	5.1	1.1	30.8	(6)	1.5	0.7	46.9	107.4	18.0	94.2	244.9	87.6	60.9	4.8	57.6	86.9	23.1
1938	10.7	19.2	41	3.8	.7	1.5	3.0	4.8	1.8	27.4	(6)	.4	1.5	50.0	99.5	19.2	89.2	222.7	98.0	66.6	3.0	47.7	101.4	20.4
1937	12.6	19.2	57	4.3	2.6	.4	3.7	1.1	2.2	102.2	(6)	.7	2.2	43.4	106.2	19.8	96.9	227.1	142.9	67.7	1.1	70.3	91.3	20.2
Nebraska:																								
1939	9.3	15.8	33	3.9	.6	1.9	1.3	.7	1.2	26.4	.3	.6	.3	16.7	108.8	26.0	88.3	207.7	68.5	52.6	1.6	69.2	61.4	15.6
1938	9.0	15.6	40	3.1	.4	1.2	1.5	2.8	1.2	14.6	.1	.6	.4	17.3	124.0	24.2	88.4	226.0	65.5	48.5	2.2	61.9	49.4	13.9
1937	10.5	15.7	51	5.2	.4	.4	4.9	2.4	1.2	76.0	.6	.3	1.6	23.7	107.3	28.5	87.7	236.8	83.5	61.2	3.1	67.1	58.2	20.1
Nevada:																								
1939	12.0	17.9	47	2.2	(6)	3.9	(6)	(6)	(6)	9.8	(6)	(6)	(6)	56.8	121.4	7.8	86.1	311.3	117.5	48.9	(6)	48.9	129.2	48.9
1938	11.9	17.0	43	3.5	2.0	(6)	(6)	2.0	5.9	2.0	(6)	(6)	(6)	67.2	100.8	15.8	83.0	276.7	128.5	57.3	(6)	37.6	102.8	37.6
1937	13.2	13.6	60	10.3	(6)	(6)	4.0	4.0	(6)	16.0	(6)	(6)	(6)	71.9	73.9	10.0	83.8	257.6	173.7	37.9	4.0	85.9	135.8	39.9
New Jersey:																								
1939	10.6	12.8	43	3.1	.2	(6)	.7	1.4	.5	9.3	.1	.5	.5	44.3	131.2	35.3	85.0	357.8	62.5	55.0	3.0	71.8	52.6	16.9
1938	10.4	12.6	43	3.5	.2	1.4	.4	1.1	.9	6.4	.1	.8	.7	46.7	126.0	30.5	81.4	335.7	72.8	57.1	3.0	76.0	54.1	18.2
1937	10.8	12.3	44	3.7	.5	2.2	.6	1.4	.7	16.8	.1	.7	1.7	50.5	122.2	32.8	79.6	331.7	92.1	57.4	2.6	74.0	74.0	24.1
New Mexico:																								
1939	14.4	36.2	99	5.2	2.4	1.9	.9	9.5	5.2	43.6	.5	(6)	1.9	96.6	64.4	9.0	52.5	144.4	148.6	75.3	12.8	63.0	88.5	40.7
1938	13.3	34.2	88	5.2	2.4	22.4	1.42	1.6	3.8	20.5	1.0	(6)	1.0	92.7	64.5	7.2	51.1	146.7	113.2	84.1	22.0	70.2	86.5	31.5
New York:																								
1939	12.2	14.4	43	3.1	.2	.6	.5	1.0	.3	6.7	.1	.4	.6	51.7	156.8	43.6	71.8	397.0	78.1	62.0	4.5	76.7	59.6	14.3
1938	12.0	14.4	44	3.9	.3	1.2	.7	1.2	.4	4.9	(6)	.8	1.0	53.9	155.9	38.2	68.3	382.4	81.6	63.3	5.3	78.2	60.4	16.4
1937	12.8	14.5	49	4.1	.3	.6	1.2	1.2	.9	17.1	(6)	.7	1.5	62.2	150.6	40.1	79.6	389.7	119.9	70.5	6.1	82.8	68.0	19.8
North Carolina:																								
1939	9.3	21.7	63	5.5	.6	3.1	.5	8.0	2.8	27.8	.1	.2	.5	54.2	57.1	13.6	83.1	163.7	79.3	57.7	15.3	83.3	59.3	21.8
1938	10.0	22.7	69	6.4	1.3	11.8	.7	7.7	3.6	19.2	.3	.6	1.1	56.1	54.0	10.9	84.0	167.4	95.2	73.2	27.2	93.3	59.3	21.3
1937	10.2	23.1	65	6.0	1.4	1.3	.4	3.6	3.0	42.6	.3	.6	1.4	60.8	52.6	11.0	82.1	165.6	107.8	60.3	16.4	90.0	67.7	24.9

North Dakota:																							
1939	7.8	18.9	52	3.6	.9	5.7	1.4	2.3	.6	27.8	(6)	1.1	.9	21.6	83.2	21.9	69.6	185.2	65.3	49.4	6.0	40.0	37.5	9.7
1938	7.1	18.5	45	1.7	(6)	2.8	3.4	8.5	.8	11.1	(6)	.6	1.4	23.9	83.2	19.9	56.4	142.7	58.4	47.3	5.1	42.2	39.9	10.5
1937	8.6	18.8	56	5.3	(6)	(6)	1.7	.3	1.1	47.4	(6)	.3	2.9	26.8	78.5	19.1	77.7	172.5	87.7	53.7	9.7	37.4	50.6	11.7
Ohio:																							
1939	12.1	15.1	45	4.2	.5	.1	1.5	1.3	.9	30.8	.1	.6	.2	47.5	131.9	31.1	117.6	325.1	82.0	58.2	2.8	83.4	79.1	23.1
1938	11.4	16.2	46	3.6	.4	5.0	1.7	2.0	1.2	14.7	.2	.3	.9	49.0	127.8	27.9	107.0	289.4	77.1	59.5	3.4	81.4	79.0	23.6
1937	12.6	14.9	53	5.8	.8	1.8	2.4	3.8	1.4	49.3	.2	1.0	2.2	54.8	113.5	28.5	115.9	299.6	111.4	63.3	4.4	85.0	92.6	36.4
Oklahoma:																							
1939	8.6	16.4	58	4.1	2.0	5.7	1.0	1.1	2.5	31.1	.4	.4	.4	43.6	72.5	12.7	81.9	153.6	80.6	48.2	5.4	56.0	88.6	18.7
1938	8.4	17.5	47	4.7	2.3	3.2	.9	10.7	4.2	22.8	1.3	.5	1.3	48.8	71.7	13.3	67.8	134.7	71.3	53.5	6.4	61.0	68.3	20.8
1937	9.2	14.2	66	6.4	2.2	1.7	1.7	1.7	2.0	71.0	1.1	.2	3.4	56.0	73.9	13.3	62.2	141.2	103.7	55.7	4.0	68.9	60.5	22.9
Oregon:																							
1939	11.6	15.9	37	1.8	.6	1.2	.8	1.2	(6)	11.8	.4	.8	.4	33.3	133.8	26.3	116.8	297.6	54.3	41.8	1.4	123.9	85.5	25.9
1938	11.8	15.8	38	3.4	.2	.6	1.4	2.5	1.4	12.7	.6	2.3	1.6	29.4	139.9	23.2	107.0	283.3	70.9	48.5	2.1	120.8	82.6	24.9
1937	13.2	15.1	46	4.3	.6	.2	1.4	2.4	.2	54.6	.6	1.0	.8	38.1	122.3	24.0	111.9	302.8	89.7	57.1	.6	115.6	88.6	29.1
Pennsylvania: [6]																							
1939	11.5	15.5	51	3.4	.7	.2	.8	2.1	1.0	21.5	(6)	.7	.8	42.7	123.7	36.8	89.8	352.5	72.8	52.5	4.0	92.0	49.4	12.6
1938	11.3	16.2	51	3.8	.5	5.0	1.9	1.8	1.2	15.4	.1	.8	.8	43.3	117.2	33.3	86.3	324.9	81.7	54.4	4.2	86.9	55.9	15.3
1937	12.6	15.6	58	5.0	.5	.9	2.4	2.9	1.3	52.9	.1	.8	2.1	51.4	115.4	35.3	84.9	337.9	114.5	55.0	4.0	96.1	61.0	20.1
Rhode Island: [6]																							
1939	12.4	14.9	41	2.4	(6)	(6)	(6)	4.3	(6)	9.9	(6)	(6)	.7	42.2	154.9	37.9	91.4	416.8	91.1	64.9	5.0	107.0	56.0	10.6
1938	12.7	15.3	42	2.3	.4	(6)	.7	2.5	.4	7.1	(6)	.7	1.4	46.5	157.6	44.4	106.1	379.8	129.2	59.3	2.8	122.8	54.3	11.4
1937	13.9	15.0	56	4.3	.4	(6)	2.1	2.5	.4	24.5	(6)	.7	4.3	55.0	162.6	45.8	109.0	412.5	146.9	56.8	3.9	126.7	46.9	13.1
South Carolina:																							
1939	9.7	19.0	76	6.5	2.9	.7	.2	9.6	1.8	37.5	2.6	.3	.6	43.0	49.3	13.1	92.5	183.1	77.0	33.5	5.1	86.6	60.1	23.1
1938	10.6	19.0	92	9.0	3.1	12.9	.6	15.4	1.3	42.6	.5	.5	.7	48.6	50.1	11.0	90.7	185.4	100.2	41.3	10.7	83.4	52.0	21.1
1937	10.6	18.4	91	8.4	4.3	1.0	.4	3.0	2.5	65.3	.6	.3	1.1	47.3	48.5	11.2	89.7	178.5	109.4	24.0	6.9	85.9	63.7	24.7
South Dakota:																							
1939	8.9	17.5	44	4.0	.3	7.9	1.5	1.2	2.9	33.8	.3	.6	.9	26.5	98.1	28.8	78.3	211.3	71.3	55.0	4.1	40.4	39.0	13.4
1938	7.2	16.3	51	3.2	1.4	.3	1.4	16.6	.6	13.1	(6)	(6)	.3	35.0	90.6	17.5	64.7	169.0	65.8	50.4	3.5	39.9	50.4	11.9
1937	9.7	16.7	57	5.6	.3	(6)	4.7	1.2	.6	70.8	(6)	.9	1.7	36.1	79.6	21.8	73.7	179.5	72.1	46.3	2.6	47.2	51.6	13.1
Tennessee:																							
1939	9.5	15.4	59	5.5	1.4	1.7	.7	3.4	1.5	49.7	.5	.7	.7	78.0	67.9	12.5	79.1	167.6	86.4	54.2	7.5	58.2	55.0	15.7
1938	9.6	15.9	66	6.3	1.6	12.1	.4	8.0	2.3	32.7	.6	.4	1.6	75.9	67.8	10.0	79.4	159.9	92.9	68.2	17.7	60.0	54.6	16.3
1937	10.6	15.5	67	8.3	2.1	1.1	.8	3.9	3.3	76.5	.5	.6	3.3	86.8	65.4	11.3	79.4	160.2	120.2	62.7	10.3	65.4	63.6	21.4
Texas:																							
1939	9.2	16.5	75	5.4	3.1	2.1	.4	4.5	2.3	24.4	.8	.4	.4	59.7	67.0	12.7	65.0	173.2	76.7	(7)	27.0	58.2	59.9	20.8
Utah:																							
1939	9.0	25.1	41	2.9	.4	.4	.4	.8	.4	13.2	(6)	.4	1.2	17.0	96.0	17.8	54.6	250.0	58.4	60.4	2.3	64.6	70.0	24.4
1938	9.3	25.3	44	4.3	(6)	3.9	1.9	5.4	1.9	13.2	(6)	.4	2.7	23.3	87.6	20.5	51.2	242.4	73.3	60.1	1.9	52.0	88.8	33.4
1937	10.1	23.5	42	3.6	.8	1.2	2.0	3.1	1.2	38.5	.4	1.2	2.0	23.7	90.5	23.7	62.2	251.0	75.4	71.5	2.3	57.9	76.5	29.1
Vermont:																							
1939	11.3	14.7	38	3.5	(6)	1.0	1.6	4.7	1.6	37.3	.5	.5	.5	43.5	131.7	34.2	114.0	380.5	107.8	42.5	4.7	76.2	56.0	12.4
1938	11.0	14.7	52	3.5	(6)	6.3	.5	3.7	6.3	18.3	.5	.5	(6)	41.3	122.8	26.6	112.3	306.7	103.4	56.9	2.1	83.6	48.1	14.6
1937	12.0	13.1	57	12.0	1.0	(6)	(6)	1.0	1.0	53.7	(6)	(6)	.5	46.9	135.8	22.6	104.2	321.7	126.4	53.2	3.7	74.8	59.5	15.8
Virginia:																							
1939	10.7	17.9	68	5.6	.7	1.2	.2	5.6	2.6	32.4	.3	.3	1.1	61.5	73.6	18.0	102.7	244.7	82.5	45.1	5.5	87.9	63.2	23.0
1938	10.7	18.4	68	5.4	1.2	6.0	.2	8.0	2.6	23.9	.3	.1	2.1	67.7	75.1	16.2	93.8	230.5	85.8	49.4	9.8	82.4	63.2	21.5
1937	11.4	18.2	69	5.4	1.0	3.7	.4	7.8	2.0	65.5	.6	.7	6.2	65.8	71.8	16.9	92.3	233.0	132.4	43.9	7.2	86.4	61.5	22.6

See footnotes at end of table.

Provisional mortality from certain causes in the first 6 months of 1939, with comparative provisional data for the corresponding period in preceding years—Continued

State and period	All causes, rate per 1,000 population (annual basis)	Births (exclusive of stillbirths) per 1,000 population (annual basis)	Rate per 1,000 live births		Death rate per 100,000 population (annual basis)																	
			Total infant mortality	Maternal mortality	Typhoid and paratyphoid fever (1, 2)	Measles (7)	Scarlet fever (8)	Whooping cough (9)	Diphtheria (10)	Influenza (11)	Acute poliomyelitis and polioencephalitis (16)	Encephalitis, epidemic or lethargic (17)	Epidemic cerebrospinal meningitis (18)	Tuberculosis, all forms (23–32)	Cancer, all forms (45–53)	Diabetes (59)	Cerebral hemorrhage, apoplexy (82a, b)	Diseases of the heart (90–95)	Pneumonia, all forms (107–109)	Diseases of the digestive system (115–129)	Diarrhea and enteritis, under 2 years (119)	Nephritis (130–132)	All accidents (176–194, 201–214)	Automobile accidents (206, 208, 210)
40 STATES—continued																								
Washington:																								
1939	11.5	14.7	42	4.1	.7	1.0	.7	.2	.5	12.9	.6	.7	.8	43.9	138.2	25.7	113.5	308.0	66.1	57.2	1.8	68.3	82.2	22.2
1938	11.3	15.1	39	3.8	.6	.2	.5	2.9	.8	15.3	.1	1.8	.7	45.6	135.2	24.5	112.9	286.5	81.6	58.2	.6	71.6	81.1	23.8
1937	12.0	14.0	44	5.1	.7	1.3	1.6	.8	1.1	42.2	.1	2.4	1.3	46.0	129.3	23.5	107.9	304.8	88.5	54.7	1.2	79.8	87.3	26.6
West Virginia:																								
1939	9.0	19.0	58	3.7	2.1	.3	1.4	2.1	1.9	28.7	.2	.8	1.8	48.1	68.2	17.1	78.8	176.2	79.0	43.4	5.2	65.5	66.3	14.8
1938	9.4	20.1	64	3.9	2.0	11.4	1.8	10.0	2.7	26.1	1.1	.7	2.8	49.8	69.1	16.3	73.3	165.0	86.6	49.8	7.6	71.6	69.1	16.5
1937	10.6	20.2	64	6.4	1.6	1.5	2.1	10.3	3.1	69.4	.8	.1	6.9	56.0	66.9	15.7	73.0	174.3	122.8	54.8	7.9	66.0	93.4	20.1
Wisconsin:																								
1939	11.5	17.6	47	3.2	.1	1.3	1.4	1.8	.2	31.5	.1	.3	.3	31.0	138.8	31.0	99.3	349.1	70.1	(7)	4.6	67.0	78.5	18.1
1938	10.6	17.9	44	2.9	.3	1.9	1.4	1.8	.4	7.7	.3	.3	.2	31.7	134.9	31.3	94.3	298.0	68.8	(7)	3.0	67.3	62.3	16.9
1937	11.9	17.3	49	3.9	.3	.1	3.5	1.0	.6	74.4	.1	.4	1.0	36.9	136.7	28.2	97.3	310.3	90.3	(7)	4.2	74.8	75.0	24.2
Wyoming:																								
1939	9.1	19.0	54	4.9	.8	.8	(6)	.8	1.7	20.3	(5)	(6)	(6)	26.2	83.5	14.3	62.4	221.1	60.8	55.7	1.7	75.1	91.1	32.9
1938	9.5	18.7	58	4.5	(5)	(6)	.8	22.1	1.7	20.4	(5)	.8	1.7	19.6	92.7	12.8	69.8	210.2	87.6	71.5	7.6	50.2	102.1	32.3
1937	11.5	18.3	54	5.1	.9	.9	6.9	3.4	(6)	81.5	.9	1.7	3.4	15.4	73.8	8.6	84.1	270.3	149.3	77.2	11.2	45.7	105.5	40.3

[1] Includes all States with data for the 6-month period of 1937, 1938, and 1939. The District of Columbia is included as a State. Estimated population July 1, 1939: 103,761,000.
[2] These data are taken from the July 1938 and 1939 Statistical Bulletins published by the Metropolitan Life Insurance Co. All figures are provisional and are subject to correction, since they are based on provisional estimates of lives exposed to risk (17,700,000 persons in 1938). Data do not include all diseases reported to the Public Health Service.
[3] Excludes pericarditis, acute endocarditis, acute myocarditis, coronary artery diseases, and angina pectoris.
[4] Classified as diarrhea and enteritis, age not specified.
[5] Chronic nephritis (Bright's disease) only.
[6] No deaths reported.
[7] Data not available.
[8] Less than 0.1 per 100,000 population.
[9] January to May.

COURT DECISION ON PUBLIC HEALTH

Compensation granted under workmen's compensation act for death from lobar pneumonia.—(North Dakota Supreme Court; *Tweten* v. *North Dakota Workmen's Compensation Bureau*, 287 N.W. 304; decided May 26, 1939, rehearing denied August 9, 1939.) A proceeding under the workmen's compensation act was instituted by a widow to recover compensation for the death of her husband from lobar pneumonia. The deceased had been employed by a county in repairing buildings, repairing and constructing fences, and planting trees. In this work the deceased was subjected to exposure to cold and wet weather. He contracted lobar pneumonia and died therefrom.

The workmen's compensation act provided as follows: "'Injury' means only an injury arising in the course of employment, * * *. The term 'injury' includes in addition to any injury by accident, any disease approximately [sic] caused by the employment."

The supreme court said that in its opinion "the conclusion reasonably to be drawn from the evidence in this case is that Tweten contracted the disease from which he died during the course of his employment, and that the exposure to which he was subjected in the course of such employment resulted in the disease from which he died." "In other words," said the court, "the evidence, as we view it, shows that the disease from which Tweten died was proximately caused by his employment."

The defendant contended that the disease from which the deceased died was not a compensable "injury" within the meaning of the compensation act, it being asserted that, in order to constitute a compensable injury, pneumonia must arise from, and be proximately caused by, some wound or injury sustained in the course of employment. The holding of the court was adverse to this contention.

DEATHS DURING WEEK ENDED SEPTEMBER 30, 1939

[From the Weekly Health Index, issued by the Bureau of the Census, Department of Commerce]

	Week ended Sept. 30, 1939	Corresponding week, 1938
Data from 88 large cities of the United States:		
Total deaths	7,781	7,722
Average for 3 prior years	[1] 7,601	
Total deaths, first 39 weeks of year	324,092	317,009
Deaths under 1 year of age	489	505
Average for 3 prior years	[1] 516	
Deaths under 1 year of age, first 39 weeks of year	19,580	20,589
Data from industrial insurance companies:		
Policies in force	66,640,202	68,322,230
Number of death claims	12,325	11,194
Death claims per 1,000 policies in force, annual rate	9.6	8.5
Death claims per 1,000 policies, first 39 weeks of year, annual rate	10.1	9.3

[1] Data for 86 cities.

PREVALENCE OF DISEASE

No health department, State or local, can effectively prevent or control disease without knowledge of when, where, and under what conditions cases are occurring

UNITED STATES

CURRENT WEEKLY STATE REPORTS

These reports are preliminary, and the figures are subject to change when later returns are received by the State health officers.

In these and the following tables, a zero (0) indicates a positive report and has the same significance as any other figure, while leaders (....) represent no report, with the implication that cases or deaths may have occurred but were not reported to the State health officer.

Cases of certain diseases reported by telegraph by State health officers for the week ended October 7, 1939, rates per 100,000 population (annual basis), and comparison with corresponding week of 1938 and 5-year median

Division and State	Diphtheria				Influenza				Measles			
	Oct. 7, 1939, rate	Oct. 7, 1939, cases	Oct. 8, 1938, cases	1934–38, median	Oct. 7, 1939, rate	Oct. 7, 1939, cases	Oct. 8, 1938, cases	1934–38, median	Oct. 7, 1939, rate	Oct. 7, 1939, cases	Oct. 8, 1938, cases	1934–38, median
NEW ENG.												
Maine	0	0	1	1	.....	.....	.....	.....	30	5	8	7
New Hampshire	0	0	0	0	.....	.....	.....	.....	41	4	0	1
Vermont	0	0	0	0	.....	.....	.....	.....	134	10	0	3
Massachusetts	7	6	6	5	.....	.....	.....	.....	64	54	36	27
Rhode Island	0	0	0	0	.....	.....	.....	.....	115	15	0	0
Connecticut	6	2	2	2	3	1	1	2	9	3	9	9
MID. ATL.												
New York	4	10	11	15	[1]3	[1]4	[1]9	[1]8	15	38	45	45
New Jersey	4	3	14	14	7	6	16	8	7	6	11	11
Pennsylvania	9	18	20	23	.....	.....	.....	.....	13	26	34	49
E. NO. CEN.												
Ohio	29	38	47	47	3	4	.....	1	15	19	5	29
Indiana	21	14	56	48	1	1	4	18	3	2	2	15
Illinois	11	17	31	31	2	3	9	11	9	13	18	18
Michigan [2]	3	3	17	17	18	17	1	1	4	4	54	27
Wisconsin	2	1	1	4	33	19	28	17	47	27	66	43
W. NO. CEN.												
Minnesota	2	1	6	9	2	1	1	1	0	0	58	5
Iowa	18	9	6	8	.....	.....	32	2	10	5	10	3
Missouri	9	7	19	30	3	2	10	35	0	0	3	18
North Dakota	7	1	2	2	.....	.....	5	.....	0	0	73	8
South Dakota	0	0	4	4	.....	.....	.....	.....	23	3	4	2
Nebraska	0	0	5	3	.....	.....	.....	.....	38	10	2	1
Kansas	8	3	9	9	8	3	6	8	84	30	4	4

See footnotes at end of table.

Cases of certain diseases reported by telegraph by State health officers for the week ended October 7, 1939, rates per 100,000 population (annual basis), and comparison with corresponding week of 1938 and 5-year median—Continued

Division and State	Diphtheria				Influenza				Measles			
	Oct. 7, 1939, rate	Oct. 7, 1939, cases	Oct. 8, 1938, cases	1934–38, median	Oct. 7, 1939, rate	Oct. 7, 1939, cases	Oct. 8, 1938, cases	1934–38, median	Oct. 7, 1939, rate	Oct. 7, 1939, cases	Oct. 8, 1938, cases	1934–38, median
SO. ATL.												
Delaware	20	1	1	1					0	0	0	2
Maryland [2 3]	9	3	15	13	15	5	2	3	6	2	14	4
Dist. of Col	24	3	7	11					0	0	4	0
Virginia	131	70	93	64	52	28	67		11	6	8	9
West Virginia	56	21	16	34	13	5	9	9	3	1	1	5
North Carolina [3]	145	99	173	112	1	1	4	4	22	15	108	11
South Carolina [3]	41	15	42	18	290	106	235	171	0	0	1	1
Georgia [3]	75	45	59	40	40	24	18		5	3	0	0
Florida [3]	15	5	9	9	6	2	1		6	2	0	3
E. SO. CEN.												
Kentucky	49	28	56	56	7	4	20	6	30	17	5	13
Tennessee [3]	62	35	48	50	7	4	28	12	11	6	2	2
Alabama [3]	56	32	46	45	21	12	19	9	16	9	13	1
Mississippi [3]	61	24	32	23								
W. SO. CEN.												
Arkansas [3]	45	18	32	25	27	11	26	7	2	1	1	0
Louisiana [3]	31	13	24	18	12	5	1	4	7	3	5	3
Oklahoma	24	12	29	21	34	17	42	32	0	0	4	1
Texas [3]	22	27	53	48	80	97	115	61	19	23	9	13
MOUNTAIN												
Montana	122	13	1	1	28	3	2	2	112	12	54	14
Idaho	0	0	1	0			1	1	10	1	3	0
Wyoming	0	0	0	0					1,353	62	20	2
Colorado	77	16	16	6	53	11			58	12	8	10
New Mexico	37	3	3	3				1	25	2	37	8
Arizona	12	1	2	2	564	46	31	17	12	1	2	2
Utah [3]	10	1	0	0	10	1			30	3	7	7
PACIFIC												
Washington	0	0	0	1					308	100	15	15
Oregon	0	0	5	3	40	8	5	14	99	20	7	7
California	10	12	34	34	19	23	11	15	63	77	169	55
Total	25	630	1,054	1,054	22	474	759	506	26	652	939	922
40 weeks	15	15,531	19,306	19,306	182	154,626	49,948	106,981	355	351,834	765,503	673,320

Division and State	Meningitis, meningococcus				Poliomyelitis				Scarlet fever			
	Oct. 7, 1939, rate	Oct. 7, 1939, cases	Oct. 8, 1938, cases	1934–38, median	Oct. 7, 1939, rate	Oct. 7, 1939, cases	Oct. 8, 1938, cases	1934–38, median	Oct. 7, 1939, rate	Oct. 7, 1939, cases	Oct. 8, 1938, cases	1934–38, median
NEW ENG.												
Maine	6	1	0	0	0	0	0	0	145	24	9	10
New Hampshire	0	0	0	0	10	1	0	0	10	1	0	1
Vermont	0	0	0	0	80	6	0	0	54	4	10	5
Massachusetts	1.2	1	0	0	7	6	0	4	29	25	57	69
Rhode Island	0	0	0	1	0	0	0	0	23	3	3	12
Connecticut	0	0	1	1	0	0	1	1	39	13	20	20
MID. ATL.												
New York	0	0	5	5	31	77	2	6	33	83	104	145
New Jersey	1.2	1	0	0	12	10	0	1	39	33	20	37
Pennsylvania	0.5	1	1	4	14	28	11	11	61	120	127	188

See footnotes at end of table.

Cases of certain diseases reported by telegraph by State health officers for the week ended October 7, 1939, rates per 100,000 population (annual basis), and comparison with corresponding week of 1938 and 5-year median—Continued

Division and State	Meningitis, meningococcus				Poliomyelitis				Scarlet fever			
	Oct. 7, 1939, rate	Oct. 7, 1939, cases	Oct. 8, 1938, cases	1934–38, median	Oct. 7, 1939, rate	Oct. 7, 1939, cases	Oct. 8, 1938, cases	1934–38, median	Oct. 7, 1939, rate	Oct. 7, 1939, cases	Oct. 8, 1938, cases	1934–38, median
E. NO. CEN.												
Ohio	0.8	1	3	2	9	12	3	7	143	186	142	142
Indiana	0	0	0	0	4	3	4	3	85	57	83	83
Illinois	0	0	1	3	5	7	3	23	76	116	195	195
Michigan [3]	3	3	2	2	40	38	2	16	121	114	226	117
Wisconsin	1.8	1	0	1	18	10	2	6	121	69	85	102
W. NO. CEN.												
Minnesota	0	0	0	0	78	40	3	4	62	32	53	53
Iowa	0	0	1	1	28	14	2	3	99	49	38	38
Missouri	0	0	0	1	0	0	1	1	53	41	42	50
North Dakota	0	0	0	0	0	0	0	1	58	8	20	17
South Dakota	0	0	0	0	45	6	1	1	90	12	20	18
Nebraska	4	1	0	0	4	1	0	1	34	9	5	12
Kansas	2.8	1	0	0	11	4	1	2	212	76	97	65
SO. ATL.												
Delaware	0	0	0	0	20	1	0	0	118	6	9	4
Maryland [2] [3]	3	1	1	2	6	2	0	1	74	24	14	32
Dist. of Col.	8	1	0	0	8	1	1	1	65	8	7	8
Virginia	4	2	0	0	1.9	1	2	3	60	32	34	35
West Virginia	2.7	1	2	0	8	3	1	4	124	46	86	79
North Carolina [3]	0	0	3	1	6	4	1	1	107	72	87	68
South Carolina [3]	0	0	1	0	8	3	1	0	14	5	11	7
Georgia [3]	0	0	0	0	10	6	2	0	40	24	20	20
Florida [3]	3	1	2	0	0	0	0	0	12	4	5	3
E. SO. CEN.												
Kentucky	1.7	1	1	1	12	7	0	3	75	43	66	66
Tennessee [3]	1.8	1	1	2	1.8	1	3	3	71	40	68	68
Alabama [3]	0	0	1	0	1.8	1	1	1	51	29	27	19
Mississippi [3]	0	0	0	0	2.5	1	0	0	15	6	17	15
W. SO. CEN.												
Arkansas [3]	0	0	0	0	5	2	0	0	22	9	20	7
Louisiana [3]	0	0	0	0	0	0	0	0	7	3	12	11
Oklahoma	4	2	0	1	8	4	0	1	18	9	33	19
Texas [3]	1.7	2	0	1	12	14	2	2	17	21	72	32
MOUNTAIN												
Montana	0	0	0	0	19	2	0	0	103	11	18	18
Idaho	10	1	0	0	0	0	0	0	41	4	1	3
Wyoming	0	0	0	0	22	1	0	0	65	3	12	12
Colorado	5	1	0	1	58	12	2	2	82	17	29	29
New Mexico	0	0	0	0	99	8	0	0	74	6	3	10
Arizona	12	1	0	0	0	0	0	0	49	4	4	5
Utah [3]	0	0	0	0	99	10	0	1	79	8	10	12
PACIFIC												
Washington	3	1	0	0	3	1	0	4	65	21	22	33
Oregon	0	0	0	0	5	1	0	2	94	19	42	36
California	1.6	2	0	0	34	42	1	18	68	83	96	120
Total	1.2	29	26	49	16	391	53	290	65	1,632	2,181	2,338
40 weeks	1.5	1,555	2,363	4,548	5	5,299	1,407	6,054	124	124,297	146,338	174,922

See footnotes at end of table.

Cases of certain diseases reported by telegraph by State health officers for the week ended October 7, 1939, rates per 100,000 population (annual basis), and comparison with corresponding week of 1938 and 5-year median—Continued

Division and State	Smallpox				Typhoid and paratyphoid fever				Whooping cough		
	Oct. 7, 1939, rate	Oct. 7, 1939, cases	Oct. 8, 1938, cases	1934–38, median	Oct. 7, 1939, rate	Oct. 7, 1939, cases	Oct. 8, 1938, cases	1934–38, median	Oct. 7, 1939, rate	Oct. 7, 1939, cases	Oct. 8, 1938, cases
NEW ENG.											
Maine	0	0	0	0	0	0	3	3	42	7	18
New Hampshire	0	0	0	0	0	0	0	0	61	6	0
Vermont	0	0	0	0	0	0	2	1	416	31	34
Massachusetts	0	0	0	0	2	2	0	3	73	62	81
Rhode Island	0	0	0	0	0	0	1	0	122	16	24
Connecticut	0	0	0	0	9	3	4	2	71	24	44
MID. ATL.											
New York	0	0	0	0	7	17	19	21	114	286	354
New Jersey	0	0	0	0	8	7	3	8	73	61	162
Pennsylvania	0	0	0	0	8	15	26	29	114	225	217
E. NO. CEN.											
Ohio	0	0	0	0	18	24	16	34	76	99	49
Indiana	19	13	3	1	0	0	11	11	49	33	8
Illinois	0	0	5	1	14	21	17	27	129	197	344
Michigan [1]	0	0	0	0	7	7	6	9	43	41	151
Wisconsin	0	0	2	1	5	3	2	4	262	149	290
W. NO. CEN.											
Minnesota	2	1	0	0	0	0	1	1	99	51	32
Iowa	10	5	0	1	10	5	4	11	20	10	22
Missouri	0	0	0	1	14	11	7	16	19	15	10
North Dakota	0	0	0	1	0	0	5	3	190	26	35
South Dakota	0	0	0	0	0	0	1	1	30	4	0
Nebraska	0	0	0	0	0	0	4	0	19	5	2
Kansas	0	0	4	0	8	3	2	5	14	5	16
SO. ATL.											
Delaware	0	0	0	0	39	2	0	2	20	1	1
Maryland [2] [3]	0	0	0	0	25	8	10	10	167	54	25
Dist. of Col.	0	0	0	0	0	0	3	1	113	14	5
Virginia	0	0	0	0	24	13	14	16	49	26	31
West Virginia	0	0	0	0	19	7	5	15	32	12	20
North Carolina [3]	0	0	0	0	4	3	6	14	69	47	108
South Carolina [3]	0	0	0	0	14	5	9	9	36	13	32
Georgia [3]	0	0	0	0	25	15	6	10	18	11	11
Florida [3]	0	0	0	0	3	1	1	0	9	3	13
E. SO. CEN.											
Kentucky	0	0	0	0	31	18	29	29	101	58	33
Tennessee [3]	0	0	0	0	11	6	7	24	56	32	27
Alabama [3]	0	0	0	0	5	3	9	9	60	34	39
Mississippi [3]	0	0	0	0	3	1	7	7	----	----	----
W. SO. CEN.											
Arkansas [3]	0	0	0	0	42	17	16	9	7	3	5
Louisiana [3]	0	0	0	0	29	12	12	12	7	3	19
Oklahoma	2	1	2	1	44	22	15	15	0	0	2
Texas [3]	0	0	0	0	41	49	23	30	32	39	65
MOUNTAIN											
Montana	0	0	7	7	9	1	7	3	9	1	23
Idaho	0	0	1	1	0	0	1	1	20	2	3
Wyoming	0	0	0	0	65	3	0	0	22	1	2
Colorado	43	9	2	1	39	8	2	4	48	10	15
New Mexico	0	0	0	0	86	7	9	13	99	8	9
Arizona	0	0	2	0	12	1	3	2	196	16	12
Utah [1]	0	0	0	0	30	3	2	1	328	33	27
PACIFIC											
Washington	0	0	3	3	25	8	9	2	34	11	37
Oregon	0	0	1	0	5	1	1	3	139	28	2
California	3	4	3	1	10	12	7	13	95	116	118
Total	1	33	35	33	14	344	347	484	78	1,929	2,577
40 weeks	9	8,846	12,967	6,286	10	10,504	11,620	12,221	145	143,682	167,172

[1] New York City only.
[2] Period ended earlier than Saturday.
[3] Typhus fever, week ended October 7, 1939, 68 cases as follows: Maryland, 1; North Carolina, 2; South Carolina, 4; Georgia, 21; Florida, 1; Tennessee, 11; Alabama, 12; Arkansas, 1; Louisiana, 4; Texas, 11.

SUMMARY OF MONTHLY REPORTS FROM STATES

The following summary of cases reported monthly by States is published weekly and covers only those States from which reports are received during the current week.

State	Diphtheria	Influenza	Malaria	Measles	Meningitis, meningococcus	Pellagra	Poliomyelitis	Scarlet fever	Smallpox	Typhoid and paratyphoid fever
August 1939										
Kentucky	60	18	39	7	6	4	15	120	1	199
Massachusetts	13		2	282	2	2	15	82	0	14
North Carolina	137		83	47	6	26	32	106	1	79
Rhode Island				93	0		1	5	0	2
September 1939										
Connecticut	5			28	0		12	38	0	13
Delaware	1			5	0		0	12	0	7
Iowa	21	1	20	21	0		35	96	17	13
Missouri	41		28	13	0	2	5	86	2	65
Pennsylvania	54			78	11		154	337	0	82
Tennessee	92	74	397	25	3	18	6	176	0	73
Wyoming	6			14	1		2	9	0	7

August 1939

	Cases
Chickenpox:	
Kentucky	7
Massachusetts	121
North Carolina	19
Rhode Island	9
Dysentery:	
Kentucky (amoebic)	3
Kentucky (bacillary)	79
Massachusetts (amoebic)	2
Massachusetts (bacillary)	12
North Carolina (bacillary)	2
Rhode Island (bacillary)	2
Encephalitis, epidemic or lethargic:	
Kentucky	1
Massachusetts	1
German measles:	
Massachusetts	16
North Carolina	8
Mumps:	
Kentucky	50
Massachusetts	83
Rhode Island	21
Ophthalmia neonatorum:	
Massachusetts	73
Rabies in animals:	
Massachusetts	3
Rhode Island	6
Rocky Mountain spotted fever:	
Kentucky	5
North Carolina	11
Septic sore throat:	
Kentucky	25
Massachusetts	5
North Carolina	7
Rhode Island	4
Tetanus:	
Massachusetts	3
Trachoma:	
Kentucky	57
Tularaemia:	
Kentucky	3
North Carolina	1
Typhus fever:	
North Carolina	15
Undulant fever:	
Kentucky	3
North Carolina	3

August 1939—Continued

	Cases
Vincent's infection:	
North Carolina	1
Whooping cough:	
Kentucky	188
Massachusetts	440
North Carolina	444
Rhode Island	125

September 1939

Actinomycosis:	
Tennessee	1
Anthrax:	
Pennsylvania	2
Chickenpox:	
Connecticut	20
Delaware	2
Iowa	13
Missouri	7
Pennsylvania	193
Tennessee	14
Wyoming	5
Conjunctivitis, infectious:	
Connecticut	1
Dysentery:	
Connecticut (amoebic)	1
Connecticut (bacillary)	2
Iowa (bacillary)	1
Missouri (unspecified)	12
Pennsylvania (amoebic)	1
Pennsylvania (bacillary)	6
Tennessee (amoebic)	6
Tennessee (bacillary)	26
Encephalitis, epidemic or lethargic:	
Iowa	1
Missouri	12
Pennsylvania	3
Tennessee	1
German measles:	
Connecticut	3
Pennsylvania	30
Tennessee	3
Wyoming	1
Hookworm disease:	
Tennessee	1
Impetigo contagiosa:	
Tennessee	17
Mumps:	
Connecticut	47
Iowa	22
Missouri	13

September 1939—Continued

	Cases
Mumps—Continued.	
Pennsylvania	220
Tennessee	19
Wyoming	20
Ophthalmia neonatorum:	
Pennsylvania	7
Tennessee	4
Rabies in animals:	
Connecticut	1
Iowa	7
Missouri	2
Rabies in man:	
Tennessee	1
Rocky Mountain spotted fever:	
Missouri	2
Pennsylvania	1
Tennessee	7
Septic sore throat:	
Connecticut	11
Iowa	1
Missouri	3
Tennessee	10
Wyoming	5
Tetanus:	
Delaware	1
Missouri	3
Tennessee	1
Trachoma:	
Missouri	38
Tularaemia:	
Iowa	4
Missouri	6
Tennessee	5
Wyoming	2
Undulant fever:	
Connecticut	5
Delaware	1
Iowa	21
Missouri	4
Pennsylvania	5
Tennessee	2
Wyoming	1
Vincent's infection:	
Tennessee	9
Wyoming	1
Whooping cough:	
Connecticut	280
Delaware	39
Iowa	51
Missouri	100
Pennsylvania	1,281
Tennessee	124
Wyoming	32

WEEKLY REPORTS FROM CITIES

City reports for week ended September 30, 1939

This table summarizes the reports received weekly from a selected list of 140 cities for the purpose of showing a cross section of the current urban incidence of the communicable diseases listed in the table.

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Data for 90 cities:											
5-year average	154	69	18	158	352	509	3	333	75	988	----
Current week[1]	82	31	10	131	300	341	0	313	40	894	----
Maine:											
Portland	0	----	0	3	3	1	0	0	0	13	21
New Hampshire:											
Concord	0	----	0	0	1	0	0	1	0	0	16
Nashua	0	----	0	0	0	0	0	0	0	0	5
Vermont:											
Barre	0	----	0	0	0	0	0	0	0	0	1
Burlington	0	----	0	2	0	0	0	0	0	3	12
Rutland	0	----	0	0	0	0	0	0	0	0	4
Massachusetts:											
Boston	1	----	1	8	7	10	0	5	2	13	191
Fall River	1	----	0	0	1	0	0	0	0	2	25
Springfield	0	----	0	0	0	0	0	1	0	1	32
Worcester	1	----	0	1	5	1	0	2	0	10	49
Rhode Island:											
Pawtucket	0	----	0	0	0	0	0	0	0	0	20
Providence	1	----	0	15	0	1	0	2	0	24	52
Connecticut:											
Bridgeport	1	----	0	0	2	1	0	0	0	0	25
Hartford	0	----	0	0	1	0	0	0	0	28	40
New Haven	0	----	0	4	0	1	0	0	1	7	44
New York:											
Buffalo	0	----	0	0	5	3	0	8	0	10	105
New York	6	6	1	6	46	25	0	58	7	120	1,360
Rochester	1	----	0	1	5	1	0	0	1	2	61
Syracuse	0	----	0	0	1	0	0	2	0	20	51
New Jersey:											
Camden	0	----	0	0	2	0	0	0	1	4	37
Newark	0	----	0	2	4	6	0	1	2	25	87
Trenton	0	----	0	1	1	0	0	2	0	0	34
Pennsylvania:											
Philadelphia	1	2	1	5	9	22	0	17	1	91	417
Pittsburgh	4	1	1	1	9	19	0	9	1	12	175
Reading	0	----	0	0	0	0	0	0	0	3	18
Scranton	0	----	----	0	----	0	0	----	0	0	----
Ohio:											
Cincinnati	15	----	0	0	1	12	0	7	0	13	111
Cleveland	2	9	0	1	10	9	0	13	1	53	160
Columbus	0	1	1	1	1	5	0	2	0	4	85
Toledo	0	----	0	5	5	5	0	2	1	27	63
Indiana:											
Anderson	0	----	0	0	0	2	0	0	0	0	7
Fort Wayne	0	----	0	0	0	1	0	0	0	0	18
Indianapolis	0	----	0	1	5	4	0	0	0	36	103
Muncie	0	----	0	0	1	3	0	1	0	0	13
South Bend	0	----	0	0	1	0	0	0	0	7	15
Terre Haute	0	----	0	0	1	0	0	0	0	0	22
Illinois:											
Alton	0	----	0	0	0	0	0	0	0	0	11
Chicago	2	----	1	4	20	31	0	24	2	65	526
Elgin	0	----	0	0	0	1	0	0	0	3	4
Moline	2	----	0	0	0	0	0	0	0	1	12
Springfield	----	----	----	----	----	----	----	----	----	----	----
Michigan:											
Detroit	2	----	0	4	8	30	0	20	1	38	216
Flint	0	----	0	0	1	1	0	1	0	5	19
Grand Rapids	0	----	0	1	2	11	0	0	0	2	28
Wisconsin:											
Kenosha	0	----	0	0	0	3	0	0	0	0	4
Madison	0	----	0	1	0	1	0	0	0	12	12
Milwaukee	0	----	0	0	2	21	0	2	0	17	108
Racine	0	----	0	1	0	1	0	0	0	5	11
Superior	1	----	0	0	0	1	0	0	0	0	8
Minnesota:											
Duluth	0	----	0	2	0	0	0	1	0	3	19
Minneapolis	3	----	0	2	5	13	0	0	0	15	96
St. Paul	0	----	0	0	5	3	0	2	0	46	48

[1] Figures for Springfield, Ill., estimated; report not received.

City reports for week ended September 30, 1939—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Iowa:											
Cedar Rapids	0	----	----	0	----	0	0	----	0	0	----
Davenport	0	----	----	0	----	2	0	----	0	0	----
Des Moines	7	----	0	0	0	7	0	0	0	0	39
Sioux City	0	----	----	1	----	0	0	----	0	0	----
Waterloo	2	----	----	0	----	2	0	----	0	2	----
Missouri:											
Kansas City	0	----	0	1	4	4	0	5	0	2	73
St. Joseph	0	----	0	1	2	0	0	2	0	0	22
St. Louis	2	----	0	0	7	10	0	9	1	11	174
North Dakota:											
Fargo	0	----	0	0	0	1	0	0	0	0	15
Grand Forks	0	----	----	0	----	0	0	----	0	0	----
Minot	0	----	0	1	0	0	0	0	0	0	5
South Dakota:											
Aberdeen	0	----	----	0	----	0	0	----	0	1	----
Sioux Falls	0	----	0	0	0	4	0	0	0	0	8
Nebraska:											
Lincoln	0	----	----	0	----	0	0	----	0	2	----
Omaha	3	----	0	0	1	2	0	5	0	1	54
Kansas:											
Lawrence	0	----	0	0	0	0	0	0	0	0	5
Topeka	0	----	0	0	1	4	0	0	0	0	16
Wichita	0	----	0	1	1	3	0	1	2	4	33
Delaware:											
Wilmington	0	----	0	0	3	0	0	1	0	6	23
Maryland:											
Baltimore	1	3	0	3	12	4	0	8	0	42	167
Cumberland	1	----	0	0	0	4	0	0	0	0	13
Frederick	0	----	0	0	0	1	0	0	0	0	5
Dist. of Col:											
Washington	1	2	2	1	6	6	0	6	1	17	147
Virginia:											
Lynchburg	3	----	0	0	0	1	0	0	0	11	9
Norfolk	0	----	0	0	3	4	0	2	0	0	22
Richmond	1	----	0	0	2	3	0	0	0	1	43
Roanoke	0	----	0	0	1	0	0	1	0	0	8
West Virginia:											
Charleston	0	1	0	0	1	0	0	3	1	0	21
Wheeling	0	----	0	1	2	0	0	0	0	0	8
North Carolina:											
Gastonia	0	----	----	0	----	0	0	----	0	0	----
Raleigh	0	----	0	0	1	0	0	0	0	0	11
Wilmington	3	----	0	0	0	0	0	0	0	0	13
Winston-Salem	1	----	0	0	2	6	0	1	0	5	22
South Carolina:											
Charleston	1	1	0	0	0	0	0	1	0	0	17
Florence	0	3	0	0	0	0	0	0	2	1	6
Greenville	1	----	0	0	0	0	0	0	0	0	10
Georgia:											
Atlanta	0	7	0	0	5	0	0	5	1	0	69
Brunswick	0	----	0	0	1	0	0	0	0	1	3
Savannah	2	----	0	0	1	1	0	1	1	0	23
Florida:											
Miami	0	2	0	0	1	3	0	1	0	0	25
Tampa	0	----	0	0	1	0	0	1	0	0	22
Kentucky:											
Ashland	1	----	0	0	0	0	0	0	0	0	6
Covington	0	----	0	0	0	4	0	3	1	0	9
Lexington	0	----	0	0	0	0	0	0	0	2	16
Louisville	0	----	0	2	0	5	0	3	0	30	58
Tennessee:											
Knoxville	0	----	0	0	2	2	0	0	1	0	24
Memphis	1	----	0	1	4	3	0	4	0	7	93
Nashville	3	----	0	0	4	5	0	1	0	4	----
Alabama:											
Birmingham	0	----	0	0	5	2	0	3	0	3	58
Mobile	1	----	0	0	1	4	0	3	0	0	23
Montgomery	0	----	----	0	----	2	0	----	0	0	----
Arkansas:											
Fort Smith	0	----	----	0	----	1	0	----	0	0	----
Little Rock	0	----	0	0	3	0	0	1	0	0	4
Louisiana:											
Lake Charles	0	----	0	0	0	0	0	0	2	0	3
New Orleans	4	2	2	0	11	4	0	9	3	16	141
Shreveport	0	----	0	0	2	0	0	2	2	0	41
Oklahoma:											
Oklahoma City	0	----	0	0	1	1	0	0	2	0	31
Tulsa	0	----	----	0	----	0	0	----	0	0	----

City reports for week ended September 30, 1939—Continued

State and city	Diphtheria cases	Influenza		Measles cases	Pneumonia deaths	Scarlet fever cases	Smallpox cases	Tuberculosis deaths	Typhoid fever cases	Whooping cough cases	Deaths, all causes
		Cases	Deaths								
Texas:											
Dallas	3	------	0	0	1	1	0	8	1	2	44
Fort Worth	0	------	0	0	3	5	0	1	0	0	31
Galveston	0	------	0	0	0	0	0	0	0	0	10
Houston	2	------	0	0	3	0	0	4	1	0	71
San Antonio	0	------	0	0	1	0	0	10	0	7	54
Montana:											
Billings	0	------	0	0	2	0	0	0	0	1	13
Great Falls	0	------	0	0	2	1	0	0	0	0	15
Helena	0	------	0	0	0	0	0	0	0	0	2
Missoula	0	------	0	0	0	0	0	0	0	2	3
Idaho:											
Boise	0	------	0	0	0	0	0	0	0	0	8
Colorado:											
Colorado Springs	0	------	0	0	0	1	0	0	0	0	5
Denver	3	------	0	2	3	1	0	0	0	1	64
Pueblo	0	------	0	0	0	0	0	2	0	2	7
New Mexico:											
Albuquerque	0	------	0	0	1	0	0	2	1	2	10
Utah:											
Salt Lake City	0	------	0	0	0	1	0	1	0	19	23
Washington:											
Seattle	0	------	0	2	3	3	0	6	0	4	105
Spokane	0	------	0	4	1	3	0	1	7	2	30
Tacoma	0	------	0	40	1	2	0	0	0	1	32
Oregon:											
Portland	0	------	0	1	1	4	0	1	0	5	75
Salem	0	------	------	0	------	2	0	------	0	0	------
California:											
Los Angeles	3	2	0	7	21	18	0	24	0	11	559
Sacramento	0	------	0	0	2	1	0	1	0	3	34
San Francisco	1	------	0	3	10	6	0	9	0	3	178

State and city	Meningitis, meningococcus		Poliomyelitis cases	State and city	Meningitis, meningococcus		Poliomyelitis cases
	Cases	Deaths			Cases	Deaths	
Vermont:				Minnesota—Continued.			
Burlington	0	0	3	St. Paul	0	0	4
Rhode Island:				Iowa:			
Providence	1	0	0	Des Moines	0	0	3
New York:				Missouri:			
Buffalo	0	0	48	Kansas City	0	0	1
New York	0	0	13	Nebraska:			
Rochester	0	0	10	Lincoln	1	0	0
New Jersey:				Maryland:			
Camden	0	0	2	Baltimore	0	0	2
Newark	0	0	3	District of Columbia:			
Trenton	0	0	1	Washington	0	0	2
Pennsylvania:				Florida:			
Philadelphia	0	0	19	Tampa	1	1	0
Pittsburgh	0	0	5	Louisiana:			
Scranton	1	0	0	New Orleans	2	0	0
Ohio:				Texas:			
Cleveland	0	0	1	Houston	0	0	2
Toledo	0	0	3	Colorado:			
Illinois:				Colorado Springs	0	0	1
Chicago	0	0	7	Denver	0	0	2
Michigan:				Pueblo	0	0	1
Detroit	1	0	33	Utah:			
Flint	0	0	2	Salt Lake City	0	0	4
Wisconsin:				California:			
Milwaukee	0	0	1	Los Angeles	0	0	14
Minnesota:				Sacramento	0	0	2
Duluth	0	0	2	San Francisco	0	0	4
Minneapolis	0	0	15				

Encephalitis, epidemic or lethargic.—Cases: New York, 4; Cleveland, 1; St. Louis, 2; Omaha, 1.
Pellagra.—Cases: Chicago, 1; Baltimore, 1; Charleston, S. C., 2; Florence, 2; Birmingham, 1.
Rabies in man.—Deaths: New Orleans, 1.
Typhus fever.—Cases: Atlanta, 2; Savannah, 2; Miami, 1; Tampa, 1; Mobile, 1; New Orleans, 2; Shreveport, 2; Dallas, 1; Fort Worth, 1; San Antonio, 1.

FOREIGN REPORTS

CUBA

Habana—Communicable diseases—4 weeks ended September 23, 1939.—During the 4 weeks ended September 23, 1939, certain communicable diseases were reported in Habana, Cuba, as follows:

Disease	Cases	Deaths
Diphtheria	11	2
Malaria	11	
Poliomyelitis	1	
Typhoid fever	24	3

Provinces—Notifiable diseases—4 weeks ended September 16, 1939.—During the 4 weeks ended September 16, 1939, cases of certain notifiable diseases were reported in the Provinces of Cuba, as follows:

Disease	Pinar del Rio	Habana	Matanzas	Santa Clara	Camaguey	Oriente	Total
Cancer	1	1		5	1	5	13
Chickenpox						4	4
Diphtheria	3	16				2	21
Hookworm disease						1	1
Leprosy				2			2
Lethargic encephalitis	1	3			1		5
Malaria	21	16	1	15	12	16	81
Measles				1		7	8
Poliomyelitis	2	5			1		8
Scarlet fever					4		4
Tuberculosis	17	64	29	21	27	50	208
Typhoid fever	32	53	18	37	19	51	210

ITALY

Communicable diseases—4 weeks ended July 16, 1939.—During the 4 weeks ended July 16, 1939, cases of certain communicable diseases were reported in Italy as follows:

Disease	June 19–25	June 26–July 2	July 3–9	July 10–16
Anthrax	21	19	19	20
Cerebrospinal meningitis	16	19	23	19
Chickenpox	419	312	397	245
Diphtheria	370	307	360	411
Dysentery (amoebic)	25	14	15	22
Dysentery (bacillary)	1	2	5	9
Hookworm disease	21	51	54	23
Lethargic encephalitis	2	1		3
Measles	1,398	1,255	1,056	950
Mumps	275	217	218	192
Paratyphoid fever	61	80	87	95
Pellagra	12	24	18	16
Poliomyelitis	130	188	222	242
Puerperal fever	19	21	23	22
Rabies				1
Scarlet fever	253	196	152	186
Typhoid fever	304	326	423	530
Undulant fever	169	156	149	134
Whooping cough	595	498	651	710

JAPAN

Tokyo—Encephalitis, lethargic.—According to a report dated September 7, 1939, an outbreak of lethargic encephalitis has occurred in Tokyo, Japan, where 523 cases were reported from January 1 to September 3, 1939, inclusive. The mortality is said to be high, a total of 145 deaths having occurred from January 1 to September 2, 1939. The numbers of new cases of the disease reported since January 1 are as follows:

	Cases
January 1 to August 27	90
August 28	38
August 29	53
August 30	74
August 31	79
September 1	68
September 2	62
September 3	59

REPORTS OF CHOLERA, PLAGUE, SMALLPOX, TYPHUS FEVER, AND YELLOW FEVER RECEIVED DURING THE CURRENT WEEK

NOTE.—A cumulative table giving current information regarding the world prevalence of quarantinable diseases for a six-month period appeared in the PUBLIC HEALTH REPORTS of September 29, 1939, pages 1792-1806. A similar cumulative table will appear in future issues of the PUBLIC HEALTH REPORTS for the last Friday of each month.

Cholera

Ceylon—Batticaloa District.—During the week ended September 30, 1939, 2 cases of cholera were reported in Batticaloa District, Ceylon.

China.—During the week ended September 30, 1939, cholera was reported in China as follows: Hong Kong, 27 cases; Shanghai, 60 cases.

India—Delhi.—During the week ended September 30, 1939, 1 case of cholera was reported in Delhi, India.

Thailand—Bangkok.—During the week ended September 30, 1939, 1 case of cholera was reported in Bangkok, Thailand.

Plague

China—Manchuria.—A report dated August 26, 1939, states that up to the beginning of August 1939, 12 deaths from plague had occurred in the neighborhood of Kailu in the eastern part of Hsingan West Province, Manchuria. The report also states that up to August 15, 1939, cases of plague had been reported in Kirin Province as follows: Changling District, 11; Chengchiatun District, 15; Chienkuochi District, 25.

Hawaii Territory—Island of Hawaii—Hamakua District.—Rats proved positive for plague infection have been found in Hamakua District, Island of Hawaii, T. H., as follows: Hamakua Mill Sector, 1 rat, July 14; 1 rat, September 6; 1 rat, September 7; Paauhau Sector, 2 rats, July 13; 1 rat, September 2; 1 rat, September 14, 1939.

India—Calicut.—During the week ended September 30, 1939, 2 cases of plague were reported in Calicut, India.

Peru—Libertad Department—Trujillo Province.—During the month of August 1939, plague was reported in Trujillo Province, Libertad Department, Peru, as follows: Trujillo, 1 fatal case; Moche, 1 fatal case.

Smallpox

Venezuela.—During the period September 1–15, 1939, smallpox (alastrim) was reported in Venezuela as follows: Caracas, 6 cases, 1 death; La Asuncion, Nueva Esparta State, 1 case; San Juan de los Morros, Guarico State, 1 case.

Yellow Fever

Colombia—Antioquia Department—San Carlos.—On September 12, 1939, 1 death from yellow fever was reported in San Carlos, Antioquia Department, Colombia.

Dahomey—Bohicon.—On October 2, 1939, 1 suspected case of yellow fever was reported in Bohicon, Dahomey.